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DISEASES CAUSED BY BACTERIA AND FUNGI.

MITCHELL, C. A., HUMPHREYS, F. A., & WALKER, R. V. L. (1933). **Viability of Streptococci in Milk.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* p. 49.

Duplicate samples of milk were kept at room temperature and at refrigerator temperature and cultures were prepared on the 1st, 5th, 7th, 12th, 14th and 18th days. Cultures grew up to five days from the samples stored in both conditions, but after this interval the growth was irregular from both sets of samples. Milk, however, kept at room temperature produced cultures after longer intervals than samples kept cold. This matter is important in routine diagnosis.—J. E.

MINETT, F. C., & STABLEFORTH, A. W. (1934). **Non-Pathogenic Haemolytic Streptococci Occurring in Milk.**—*J. Dairy Res.* **5.** 223-232. 7 figs. on 1 plate, 2 tables. [10 refs.]

A description is given of the characters of certain streptococci which in small numbers are sometimes found in the milk of individual cows. Although the organisms possessed high haemolytic activity, they showed no evidence of pathogenic power, either for the cow's udder or for ordinary small laboratory animals. Not only are they different from the streptococci of bovine mastitis, but they are also to be distinguished from streptococci of the *Str. pyogenes* group which are occasionally found in milk. One of their principal characters is the formation on solid media of minute colonies, consisting of relatively minute cocci, which grow in broth as very short chains.

The fifty-eight strains studied could be divided into two groups on biochemical grounds : (a) those fermenting glucose and lactose with production of small amounts of acid, (b) those which ferment mannite and salicin as well. The former are referred to as " low-acid " strains and the latter as *Str. infrequens*, as they bear a resemblance to the organism given this name in Holman's classification. Fermentation of sorbite and trehalose occurred with streptococci of both groups.

The two groups could be distinguished from *Str. pyogenes* and the ordinary mastitis *Streptococcus* by direct agglutination. For distinguishing the two groups from each other, agglutinin absorption methods were required. It was then found that the low-acid *Streptococcus* possessed two antigens of which one only was represented in *Str. infrequens*.

JUNACK, M. (1934). Zur Aetiologie der Muskelknoten des Rindes. B. pyogenes auch in der Unterhaut des Schweines. Beitrag zur Schweinbotryomykose-frage. [**Aetiology of Muscle Nodules in Cattle.** *Corynebacterium pyogenes* **in the Subcutis of Pigs. Botriomycosis in Pigs**].—*Z. Fleisch- u. Milchhyg.* **44.** 465-466.

Nodules of varying sizes very commonly occur in the muscle tissues of healthy cattle. Several cases are described in which the presence of *C. pyogenes* in such nodules was demonstrated in stained preparations. Multiple abscesses containing this organism are encountered in the subcutaneous tissue of pigs. From one case of botriomycosis in the pig the author isolated *Staphylococcus aureus* and from another case a mixture of *S. aureus*, *S. albus* and *S. citreus*.—E. J. PULLINGER.

WEIDLICH, N. (1934). Dauerbesiedelung des Euters mit Milzbrandbazillen bei einer Kuh. [**Infection of the Udder of a Cow by Anthrax Bacilli**].—*Wien. tierärztl. Mschr.* **21.** 289-292. [3 refs.]

A cow, infected with anthrax, was treated with antiserum and recovered. Thereafter an acute mastitis developed and anthrax bacilli were excreted in the milk. Subsequently the mastitis disappeared. After being dry for two months the cow produced a normal calf, but once again anthrax bacilli were excreted in the milk. At subsequent autopsy, anthrax infection was found only in the udder, where it had become localized.—E. J. PULLINGER.

—. (1934). Ziekte- en sterfgevallen onder paarden na vaccinatie tegen miltvuur. [**Mortality and Illness following the Vaccination of Horses against Anthrax**]. —*Ned.-ind. Bl. Diergeneesk.* **46.** 167-175.

A report of cases of local and general illness in horses following inoculation with " P.G.V. vaccine " [nature of which is not given—ED.] against anthrax in the Dutch East Indies.

From the local swellings which arose, *B. anthracis* was never demonstrated. The condition was considered to be anaphylactic in nature.

—A. KLARENBEEK (UTRECHT).

I. LOCKAU, U. (1933). Untersuchungen über das Vorkommen und die klinische Feststellung der Gebärmuttertuberkulose. [**Uterine Tuberculosis**]. —*Berl. tierärztl. Wschr.* **49.** 613-617. 2 figs., 1 table. [8 refs.]

II. NIELSEN, F., & PLUM, N. (1934). **Uterine Tuberculosis in Cow.**—*Acta path. microbiol. scand.* Suppl. 18. pp. 181-204. 5 tables. [Orig. in English].

I. The author writes on the incidence of uterine tuberculosis in cattle as found at meat inspection by himself and others and refers to the difficulty of diagnosing the condition by clinical methods. 4 or 5 per cent. of cows slaughtered in Germany are affected with uterine tuberculosis. The lesions of 45 cases of genital tuberculosis examined by the author are described : they varied appreciably in form and situation.

II. According to the authors' experience it is often extremely difficult or impossible to demonstrate tubercle bacilli in the vaginal content of cows, recognized by clinical diagnosis and later by autopsy, as affected with uterine tuberculosis.

In order to examine the role of the puerperium on the course of uterine tuberculosis in cows, 386 cases were investigated for a period extending over a puerperium. The vaginal content was examined microscopically and by guinea pig tests.

In 255 cases, comprising cows killed later than one month after calving or aborting, uterine tuberculosis was combined with peritoneal tuberculosis in about

60 per cent., with tubal tuberculosis in more than 50 per cent., with vaginal tuberculosis in nearly 20 per cent., and with tuberculosis of Gärtner's ducts in 40 per cent. In 178 cows killed within one month of calving or aborting, the corresponding figures were 35 per cent., 30 per cent., 2 per cent., and 10 per cent. The latter figures suggest that tuberculosis of the vagina and Gärtner's ducts is secondary to the uterine tuberculosis and that tubal and peritoneal tuberculosis may develop secondarily through infection from the uterus.

Bacillary excretion is dependent chiefly upon the condition of the surface of the uterine mucosa (if broken even to a very slight extent) and less upon the extension of the diseased process. Even in rather severe forms of uterine tuberculosis with marked destruction of the mucous membrane, only a few bacilli may be shed. It appears that the excretion of bacilli is most abundant during the first part of the puerperium and decreases towards the end.

The uterus appears to become infected by way of the blood stream during pregnancy. In rare cases it may be an ascending infection from a primary infection of the vulva. The tuberculous changes in the pregnant uterus vary from an absence of macroscopic processes to enormous lesions involving the uterine wall.

—A. W. N. Pillers.

Plum, N. (1934). Genitaltuberkulosens patogenese og bakteriologiske diagnose. [**Pathogenesis and Diagnosis of Genital Tuberculosis in the Cow**].—*Maanedsskr. Dyrlaeg.* **46.** 225-234. 3 tables.

Pursuant to the provisions of the law in force, animals with uterine tuberculosis must be killed under Government authority. 3,742 of the suspicious samples of uterine mucus sent to the diagnostic laboratory in this connection have been used for microscopic examination and, in the case of those that were negative on microscopic examination, for inoculation into guinea pigs. Through microscopy alone, tubercle bacilli were found in 48·1 per cent. and with microscopy combined with inoculation into guinea pigs, 55·9 per cent. From 207 microscopically positive samples, attempts were made to grow cultures on Löwenstein's, Sunniyoski's and Hohn's culture media. The result was not satisfactory, as no growth was obtained from 14·4 per cent. of the samples that had proved to contain tubercle bacilli by means of the other tests. The author believes that most cases of uterine tuberculosis occur by the haematogenous route during pregnancy. The peritoneum may then be infected from the uterus, and the reverse may also be the case.

—H. C. Bendixen (Copenhagen).

I. Finzi, G. (1933). Tuberkulose-Antikörper und spezifische Therapie der Tuberkulose. [**Antibodies and Specific Treatment of Tuberculosis**].—*J. Jap. Soc. vet. Sci.* **12.** 238-250. [10 refs.] [Orig. in German].

II. Dreyer, G., Vollum, R. L., & Ammitzböll, H. H. (1934). **A Nine Years' Field Experiment on the Immunisation of Cattle against Tuberculosis.**—*J. comp. Path.* **47.** 1-31. 9 tables. [2 refs.]

III. Rautmann, H. (1934). Ein neuer Weg zur Erzeugung einer Tuberkulose-Immunität. [**A New Way to produce Immunity to Tuberculosis**].—*Tierärztl. Rdsch.* **40.** 212-216. 3 tables.

I. A high antibody content against tubercle bacilli was produced in lactating cows and in horses by the inoculation of extracts of tubercle bacilli. Inoculations were continued at intervals for six to eight months. Antiserum from these animals neutralized tuberculin, so that if a mixture of the two was inoculated intradermally into a tuberculous animal no allergic action resulted. *In vitro* the antiserum showed a precipitating action to a titre of 1 : 10,000. Similar antibody

was demonstrable in the cows' milk, the titre being lower. It is claimed that such antiserum would have a valuable therapeutic action when inoculated into suitable tuberculous subjects.

II. The value of " defatted " tubercle bacillus (" diaplyte ") as a vaccine, has been examined in a field experiment carried out in Denmark. " Defatting " is effected by distillation of the tubercle bacilli in acetone in a Soxhlet apparatus. The organisms are then suspended in saline by grinding in a ball mill.

Vaccination consisted of a series of injections of 1·5, 3·0, 4·5 and 6·0 c.c. given to calves at intervals of a few weeks. For adult animals larger doses were used.

At the commencement of the experiment there were 142 tuberculous animals. These were disposed of gradually during the course of nine years, but as long as they remained upon the premises no special attempt was made to segregate them from the healthy herd. Three of these animals received a course of vaccination, the results of which suggested that the vaccine might assist the healing of tuberculous lesions.

Amongst 281 vaccinated calves brought up on this heavily infected farm in contact with tuberculous animals, there were only two clinical cases of tuberculosis. 55 per cent. of these calves were eventually examined *post mortem* and 89 per cent. were free of any lesions of tuberculosis : in 5·5 per cent. there were healed lesions, while in 5·4 per cent. there were active tuberculous processes. Of 134 animals which reacted to the tuberculin test, 53·7 per cent. subsequently ceased to react ; this is taken as evidence that the reaction was due to vaccination. Some adult animals were bought, 15 of which were non-reactors ; all were vaccinated and remained free from tuberculosis. Only 14 non-vaccinated control calves were retained ; of these, 13 subsequently became tuberculous.

III. It is claimed that feeding a vaccine, consisting of heat-killed saline suspensions of tubercle bacilli, to rabbits in increasing daily doses of 0·25 to 6·0 c.c. for 60 days (the total dosage per rabbit being from 70 to 255 c.c.) slows down the progress of infection and generalization of the disease, if the rabbits are subsequently injected with virulent tubercle bacilli. [An inadequate number of rabbits were used in the investigation].—E. J. Pullinger.

Clausen, A. E. (1934). Om Tuberkulosebekaempelse. [**The Control of Tuberculosis ; Experiences from the Island of Samsø**].—*Maanedsskr. Dyrlaeg.* **46.** 208-215.

On the island of Samsø the author has carried out systematic tuberculin tests in two of the five dairy districts of the island, comprising 423 herds. In 1928 to 1929 about 62 per cent. of the herds were tuberculous and in 1933 about 22 per cent. On an average each herd consisted of ten animals. During recent years numerous instances have been observed in which the herds have been cleared of tuberculosis, without actual measures of isolation having been taken, solely through successive sale of reacting animals. At the same time measures have been taken to prevent new purchases of reacting animals for completing tuberculosis-free herds and herds affected to a small extent only.—H. C. Bendixen (Copenhagen).

Plum, N. (1934). Om Tuberkulose. Gamle Betragtninger og nye Iagttagelser. [**Bovine Tuberculosis. Old Considerations and New Observations**].—*Maanedsskr. Dyrlaeg.* **46.** 176-189 and 201-208. 8 figs.

The author refers to various types of tuberculosis. Eleven cases of primary vulvar tuberculosis were reported, in which the infection seems to have occurred as a consequence of obstetric aid, vaginal examination, mating or in some unknown

manner. Primary tuberculosis of the genital mucous membrane of the male animal also occurs. The author has found tuberculosis in the superficial inguinal lymph glands in one out of every 5,000 bull calves examined. In one district where tuberculosis was prevalent almost all the stud bulls killed were found to be suffering from tuberculosis of these glands.

On the basis of examinations of the uterus of 28 non-pregnant heifers, aged from six to 12 months, the author maintains that tubercle bacilli can be excreted with the uterine mucus in demonstrable quantities from an existing peritoneal tuberculosis, without the uterus itself being affected. In mucus obtained from the corpus uteri the bacteria have often been found in clumps of 20 to 50, and it is therefore concluded that the tubercle bacilli may multiply in the secretion of the uterus.—H. C. Bendixen (Copenhagen).

Hofferber, O. (1934). Ein Beitrag zur Hämatologie des Rinderblutes unter besonderer Berücksichtigung des Blutbildes tuberkulöser Tiere. [**Haematology of Cattle with Particular Reference to Tuberculosis**].—*Arch. wiss. prakt. Tierheilk.* **68.** 50-66. 4 tables. [30 refs.]

This paper records investigations into bovine haematology consisting of the examination of the blood of 106 slaughter cattle of which 69 were free from tuberculosis and 37 were affected. Counts were made of the red and white cells, and the percentages of the varieties of the latter, and an estimation of the haemoglobin content was carried out.

The corpuscular sedimentation test was not found to give much information when dealing with bovine blood, as the rate of sedimentation is always extremely slow. The blood counts of cattle are subject to considerable variation which may depend on age, sex, period of lactation, method of feeding and other causes. In healthy bulls the polymorphonuclear corpuscles varied from 15 per cent. to 54 per cent. and in healthy cows from 3 per cent. to 65 per cent.

In tuberculous animals the blood picture varied considerably with the activity of the disease process. A normal blood picture does not guarantee freedom from tuberculous alterations, but, in general, active disease causes a more or less marked alteration. The presence of tuberculosis is indicated by distinct anaemia combining a decrease in the number of erythrocytes with a decrease in the haemoglobin content and a normal, or somewhat lowered, colour index. There is also usually a considerable alteration of the ratio of polymorphonuclear leucocytes to mononuclear leucocytes, and immature cells and even myelocytes appear. The author concludes that, although a diagnosis of tuberculosis cannot be made from a blood examination, yet it may prove of value in combination with clinical examination and other aids to diagnosis.

The review of previous records and the references given to other work on bovine haematology should be useful to those interested in this subject.

—U. F. Richardson.

Stürz, K. (1933). Humane und bovine Hauttuberkulose. [**Human and Bovine Types of Tuberculosis of the Skin**].—*Arch. Derm. Syph., Wien.* **169.** 220-235.

Twenty-one cases of lupus [tuberculosis of the skin] in human beings are described. In one case both human and bovine strains of *Mycobact. tuberculosis* were isolated from a single focus of infection. The bovine type was isolated from eight cases and the human type from seven cases. Cultures were negative in five cases.—E. J. Pullinger.

REED, G. B., ORR, J. H., & RICE, Christine E. (1934). **Studies in the Variability of Tubercle Bacilli. VIII. BCG.**—*Canad. J. Res.* **11.** 362-377. 10 figs. on 2 plates, 4 tables. [38 refs.]

Five cultures of BCG from different sources were studied. Four of them consisted entirely of R types, but one culture, although consisting chiefly of R types, also contained a few S type colonies. Whereas the R form appeared at first to be a fixed type, observations over a period of three years showed that R to S dissociation occurred in two of the strains. Although such dissociation may not occur in routine BCG vaccine preparation, it does, according to the authors, point to the necessity of exercising very rigid control over its production.

As in other bacterial species, virulence is linked up with the type of colony, the R or ordinary BCG strain producing only localized lesions, whereas the S form gives rise to progressive infection in the guinea pig. Also, the complement-fixation test appears to indicate that certain antigenic fractions are present in the S which are absent in the R type, this being in keeping with our knowledge of other organisms. This lack of antigen in BCG points to a lack of the corresponding antibody in animals immunized with it and, in the words of the authors, " offers the more serious commentary on the BCG vaccine problem."

—GWILYM O. DAVIES.

SULMANN, F. (1933). Variationen bei Bakterien. I. Experimentelle Versuche zur Steigerung der BCG-Virulenz durch Dissoziation auf Eiernährböden und durch mitogenetische Bestrahlung. [**Bacterial Variation. Investigation of the Effect upon the Virulence of BCG of Growth upon Egg Medium and of Mitogenetic Radiation**].—*Z. ImmunForsch.* **81.** 1-31. 5 tables. [33 refs.]

The author has examined the pathogenicity of BCG in view of various reports regarding the dissociation of BCG into virulent and avirulent forms. The organism has been cultured on Sauton's, Petroff's, Petragnani's and Hohn's media, pathogenicity being tested by the inoculation of culture into guinea pigs and rabbits. None of these media influenced the pathogenicity of BCG, which remained non-pathogenic if administered in minimal doses, but produced atypical lesions when administered in large amounts. Prolonged mitogenetic irradiation of such cultures, grown upon Petroff's medium, lowered their invasive power. It was not possible to raise the virulence by rapid animal passage.—E. J. PULLINGER.

PLUM, N. (1934). Rendyrkning af Tuberkelbaciller som Led i den daglige Laboratoriumsdiagnostik. [**Cultivation of** *Mycobacterium tuberculosis* **as a Method of Diagnosis in Routine Laboratory Examination**].—*Maanedsskr. Dyrlaeg.* **46.** 312-322.

Löwenstein's and Besredka's culture media were employed. The glycerol of the former was replaced by a double amount of tuberculin. The material examined was pulmonary mucus, udder secretion and uterine discharge : it was treated for ten minutes with 5 per cent. sulphuric acid. The sediment from centrifugation was inoculated direct on to the solid culture medium and also after neutralization into the fluid medium. Control inoculations into guinea pigs were only performed with the samples of uterine discharge. Only 37 samples out of 71 that were positive when inoculated into guinea pigs were positive when cultivated. Seven samples were positive when cultivated, but not when inoculated into guinea pigs [these may have been avian type infections]. 85·9 per cent. of those that were positive on microscopic examination were also positive when cultivated. 12·7 per cent. of those that were negative on microscopic examination were positive

when cultivated. In the case of the lung and the udder samples the results seem to be more favourable. Samples from the lung that were positive on microscopic examination yielded a growth in 85·6 per cent. of cases : those that were negative on microscopic examination, in 25·7 per cent. Udder secretion that was positive on microscopic examination yielded a growth in 96·2 per cent. of cases and the negative samples, in 9 per cent. Cultivation technique is not yet as reliable as guinea pig inoculation. An improvement of the technique is in progress.

—H. C. Bendixen (Copenhagen).

McIntosh, C. W., & Konst, H. (1933). **Johne's Disease or Paratuberculosis of Cattle.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* pp. 50-51.

Five strains of *Mycobact. paratuberculosis* from various sources were studied and johnin was prepared from cultures on Long's liquid synthetic medium. One case of Johne's disease was investigated and attempts were made to transmit the disease by feeding minced intestinal mucosa to sheep and calves. One positive result was obtained in a 20-month-old calf.

Experiments on the preparation of johnin are being continued.—J. E.

Manninger, R. (1934). Considérations critiques sur l'étiologie et la prophylaxie de la septicémie hémorragique. [**Aetiology and Prophylaxis of Septicaemia Haemorrhagica**].—*Bull. Off. internat. Epiz.* **8.** 118-155 and 474-487.

This is a comprehensive survey of existing knowledge on the pasteurella group of organisms. Manninger insists that only those diseases caused by pasteurella should be designated haemorrhagic septicaemia.

Pasteurella are very small coccoid organisms about 0·25μ in diameter. They do not possess cilia and do not form spores. There is no growth on untreated (acid) potato. They ferment glucose, saccharose and mannite with production of acid but no gas, and do not produce acid or gas with lactose. No cultural differences exist between the pasteurella obtained from different species of animals and even serological tests do not invariably distinguish between them.

Manninger does not agree with the view that pasteurella organisms may on occasion live a saprophytic existence outside the animal body. He mentions that Csontos observed that, on premises where fowl cholera had occurred, 53 per cent. of the birds on the average were " carriers " of the causal organism.

According to Manninger, pasteurellosis of mammals is a relatively rare disease that occurs only when the normal resistance has been reduced, and that its economic importance is insufficient to justify compulsory notification. The disease is not contagious.

An interesting discussion took place on the report and several speakers disagreed with some of the statements made by Manninger on important phases of the disease. Hassanein claimed that the disease as it occurs in buffaloes in Egypt is contagious. He stated that pasteurella could be divided into two groups according to whether they fermented or failed to ferment mannite. Lourens did not consider that pasteurella of different origins necessarily belonged to the same species. He pointed out that a dose of 10^{-6} c.c. of culture of the fowl cholera organism killed a pigeon in 24 hours whereas the inoculation of 0·1 c.c. of culture of a bovine strain failed to affect a pigeon. Ruzicka expressed the view that immunologically distinct strains occurred within the pasteurella group. Ciuca stated that pasteurellosis of buffaloes (barbone) and of fowls were undoubtedly contagious.—T. M. Doyle.

WEBER, & BINDRICH. (1934). Die Wild- und Rinderseuche in Ost- und Westpreussen in den Jahren 1926-1932. [**Haemorrhagic Septicaemia in Cattle in East and West Prussia in 1926-1932**].—*Z. InfektKr. Haustiere.* **46.** 15-27. 4 figs., 1 table. [8 refs.]

Haemorrhagic septicaemia first appeared in East Prussia in 1926, and spread over a strip of country running from south-east to north-west. In the six districts affected the mortality figures were 94, 46, 2, 20, 21 and 10. It is of interest that the district showing the lowest mortality completely bisected the infected region. The seasonal distribution of mortality is also of interest. The district showing the highest mortality had a wave of infection in early summer, an abatement in late summer (August) and a further rise reaching the apex in November, followed by a rapid fall. Other districts showed very similar waves of infection. The total mortalities for June, July, September and October were equally high, whilst the November mortality was higher still by 25 per cent.

Of 193 animals which died, five were horses, the remainder being cattle. Of 188 cattle, 66 were young cattle, 47 calves, 43 cows, 22 bulls and 10 oxen.

—E. J. PULLINGER.

I. OCHI, Y. (1934). **Studies on Haemorrhagic Septicaemia Organisms. Report VI. On the Relation between Four Types of Haemorrhagic Septicaemia Organisms Classified by me and the Diseases of Various Animals Caused by them.**—*J. Jap. Soc. vet. Sci.* **13.** 163-180. 3 tables. [10 refs.] [Orig. in Japanese : abst. from English summary].

II. ZAZIEN, K. (1934). **Serological Studies on Haemorrhagic Septicaemia Organisms, Especially in Their Complement Fixation Reaction.**—*Ibid.* 181-191. 7 tables. [11 refs.] [Orig. in Japanese : abst. from English summary].

I. All type A strains were isolated from domestic fowls and ducks (fowl cholera) and were non-pathogenic for mammals with the exception of small experimental animals.

Types B, C and D were not related to particular species. Type B was very virulent for cattle, swine and other mammals and caused acute haemorrhagic septicaemia. Types C and D were isolated from, and responsible for, the chronic broncho-pneumonia type of pasteurellosis as seen in so-called chronic swine plague, infectious broncho-pneumonia of cattle and sheep, and snuffles in the rabbit.

In a previous publication [*J. Jap. Soc. vet. Sci.* **12.** 185.] the author stated that the four strains could be distinguished by their serological, immunological and pathogenic properties.

II. The author applied the complement-fixation test to the four pasteurella strains isolated by OCHI [see I] and was able in this way to confirm the existence of four serologically distinct strains.—GWILYM O. DAVIES.

LÖNDBORG, G. (1934). Undersökningar över serumbehandlingens och vaccinationens betydelse som stridsmedel mot pasteurella-infektion hos svin. [**Experimental Investigations on Immunization against Pasteurella Infections in Swine**].—*Skand. VetTidskr.* **24.** 352-379. 8 tables. [English summary : abst. from orig.]

A number of pigs were vaccinated with dead pasteurella culture. They were infected intravenously with the same strain 3, 6, 9 and 12 weeks later. No reactions were observed and the control animals died in the course of 16 hours.

Hypodermic injections of pasteurella serum were given to mice. Twenty-four hours later the mice were infected hypodermically with the homologous strain. The control mice died two to three days later, whilst those treated with

serum died five to seven days later. In an experiment with pigs (intravenous infection) the control animals died 16 hours after the experiment, whilst those treated with serum died five to seven days later. It appears that the protective action of serum becomes weak as early as four days after the injection. The author concludes that serum treatment is of value in combating pasteurella infection in swine. Vaccine treatment is of no value.

—H. C. Bendixen (Copenhagen).

Löndborg, E. G., & Plazikowski, U. (1933). Vaccinationsförsök mot infektion med en pasteurella-liknande bakterie hos svin. [**Experimental Bacterin Treatment of Pigs against Infection with a Pasteurella-Like Organism**].—*Skand. VetTidskr.* **23.** 361-367. 2 tables. [English summary : abst. from orig.]

The carcass of a pig sent to the laboratory for *post-mortem* examination showed wide-spread peritonitis, bilateral pleurisy and pericarditis, all with sero-fibrinous exudate and accompanied by acute congestion of the spleen.

A Gram-positive bi-polar organism was found microscopically in the heart blood ; 24-hour cultures on brom-cresol purple lactose agar showed colonies of the same type of organism, some on the surface and others deep in the medium ; acid was formed but no gas. The organisms were larger than pasteurella, but similar in shape. Good growth, with an outer ring of colonies, was obtained in agar stab cultures ; good growth also occurred in gelatine stabs, but there was no liquefaction. The organism differed from pasteurella in that it fermented lactose, has a high virulence for pigs and a putrid odour in culture.

Mice and six-week-old pigs died one to two days after inoculation with 5 and 10 c.c. respectively of a 24-hour broth culture.

Twelve six-week-old pigs were inoculated with the bacterin, along with seven controls. They were afterwards infected in three groups of four pigs at 14 day intervals with 20 c.c. doses of 24-hour broth culture. The first group died one day after infection, the second group in from one to seven days and the third group in two days. Any immunity that had developed as a result of these inoculations had disappeared at the end of six weeks.—A. A. Forsyth.

Biester, H. E. (1934). **The Role of Salmonella suipestifer in the Production of an Enteric Disease Independent of Hog Cholera Virus.**—*J. comp. Path.* **47.** 190-196. [6 refs.]

The author states that a disease of pigs, distinct from swine fever [hog cholera], although commonly mistaken for it, is frequently observed. It is recognized as a distinct clinical and pathological entity and is generally referred to as " necrotic enteritis ". In uncomplicated cases of this disease there are primary diffuse, diphtheritic membranes in the large intestine. It is common in young pigs, but occurs also in pigs over three months of age.

Those familiar with swine fever can usually differentiate between it and uncomplicated necrotic enteritis. Biester states that, in the first three cases of necrotic enteritis which he studied, filtered blood was inoculated into susceptible pigs in order to remove the possibility of swine fever. He considers that this was an unnecessary and costly procedure because he was capable of differentiating the two diseases and because some herds in which the enteric disease appeared were already immune to swine fever.

Histological examination of tissues from the central nervous system and white blood cell counts are useful aids to diagnosis.

The initial rise in temperature of pigs artificially infected with *Bact. suipestifer*

occurs earlier than the initial rise in temperature in pigs artificially infected with swine fever.

In over 150 pigs examined there was a complete absence of petechiae and ecchymoses in the kidneys, bladder, lymph nodes, larynx, subcutis and serous membranes, which fact alone rules out the possibility of swine fever.

Experimental work has clearly shown that *Bact. suipestifer* is capable of producing a pathological enteric condition under poor sanitary conditions in the field in pigs both immune and susceptible to swine fever and that the disease can be artificially induced.

Actinomyces necrophorus assumes an important role in the production of the characteristic intestinal lesions.—T. M. Doyle.

Raif, M. (1934). Pendik-Bouillon. Ein Spezialnährboden für die Differenzierung von Pullorum- und Geflügelcholerabakterien. [**A Broth Medium for the Differentiation of** *Bacterium pullorum* **and** *Pasteurella aviseptica*].—*Wien. tierärztl. Mschr.* **21.** 395-396.

Ordinary nutrient broth, to which salicylic acid has been added in the proportion of 1·5 g. per litre, the pH being corrected to 7·4, allows members of the salmonella group to develop normally, whilst growth of all members of the genus *Pasteurella* is inhibited.—E. J. Pullinger.

I. Brill, J. (1933). Analyse comparée des antigènes de différentes souches du Bacille de l'avortement des Juments. [**Comparative Analysis of Antigens of Different Strains of** *Bact. abortus equi*].—*C. R. Soc. Biol. Paris.* **114.** 199-200.

II. Miessner, & Köser. (1933). Das ansteckende Verfohlen und seine Bekämpfung. [**Infectious Equine Abortion** (*Bact. abortus equi*)].—*Dtsch. tierärztl. Wschr.* **41.** 753-757. 2 figs., 3 tables.

I. Examination of six strains of *Bact. abortus equi* has confirmed the antigenic structure of this species as outlined by White and by Kauffmann. In addition to the " O " antigen originally named by White, II 7. 8., the author finds an additional minor antigen proposing that the antigenic formula consists of II 7. 8. 9. He states that *Bact. abortus ovis* has a similar additional minor antigen, 9. [The Report of the Nomenclature Committee of the International Society for Microbiology. – this *Bull.* **5.** 63. – assigns factor IV to both *Bact. abortus equi* and *Bact. abortus ovis*, the factors originally used by Kauffmann].

II. The second paper deals with equine abortion and it is considered that the portal of entry is the mouth, that there is an incubation period of four to six weeks and that abortion frequently occurs from the eighth month of pregnancy onwards. Details of the history of various mares are given and the percentage losses, due to their being barren or to death of the foetus, varies from 15 to 70. When consideration is given to the forebears of such animals the percentage losses vary from 14 to 27. Details are also given concerning diagnosis, attention being drawn to the use of the agglutination test, but it is pointed out that clinically healthy mares may react to a titre of 1 : 300. Isolation of infective mares, adoption of hygienic principles and immunization with a formolized vaccine are recommended.
—R. Lovell.

Caldwell, Dorothy W., Parker, N. J., & Medlar, E. M. (1934). **Studies on a Herd Infected with Brucella abortus. II. Incidence of Milk Contamination in a Vaccinated Herd.**—*J. infect. Dis.* **55.** 235-242. 2 tables. [31 refs.]

Tests revealed that 23·6 per cent. of cows containing *Br. abortus* serum

agglutinins were discharging the organisms in their milk. Of these, 72 per cent. had been vaccinated. In one case, organisms were detected in the milk before a positive agglutination test was returned. In 13 positive reactors, daily examinations of the milk for three weeks failed to reveal *Br. abortus* and even in other cases the organisms were discharged so irregularly that numerous examinations were necessary to detect infection.

The authors are of the opinion that, as the most important point in milk production is safety for human consumption, efficient pasteurization is the only safeguard.—Gwilym O. Davies.

Balozet, L., Cordier, & Ménager, J. (1934). L'infection de la mamelle par les brucella et les réactions d'agglutination avec le lacto-sérum. [**Infection of of the Udder with *Brucella* and Agglutination Tests with Whey**].—*Arch. Inst. Pasteur Tunis.* **23.** 332-347. 4 tables, 8 graphs. [16 refs.]

A high agglutinating titre of whey which approaches that of blood serum indicates the presence of mammary gland infection and in consequence the probable excretion of *Br. abortus* in the milk. On the other hand, a comparatively low whey titre accompanying a high blood-serum titre suggests the absence of mammary gland infection, the agglutinins in the milk being derived from the blood.

The authors arrived at these conclusions after a series of experiments on cattle and goats. Killed *Br. abortus* suspensions were injected at weekly intervals both intravenously and subcutaneously and the titres of the serum and whey studied. In a second series similar observations were made following the injection of the organisms into the mammary gland. In the latter experiments it was shown that, in addition to the blood, agglutinins were formed in the gland, as only the milk from the injected gland contained agglutinins. The production of agglutinins in the gland is slow, inconstant and feeble as compared with that in the blood, and in some instances cattle excrete *Br. abortus* without showing any agglutinins in the milk. On the other hand, the finding of agglutinins in milk is no criterion that *Br. abortus* is being excreted in the milk. The best way to determine this is to prepare cultures from the milk on a selective medium.—Gwilym O. Davies.

Mitchell, C. A., Humphreys, F. A., & Walker, R. V. L. (1933). **The Relationship of Streptococcic Infection in the Udder to Infection by the Brucella Abortus.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* p. 48. 2 tables.

Examination of the milk for streptococci by cultural methods was carried out on 126 cows presenting evidence of *Br. abortus* udder infection, on 67 cows infected with *Br. abortus*, but not in their udders, and on 149 cows free from *Br. abortus* infection. In the first group *Streptococcus mastitidis* was demonstrated in 44 cows, in the second group in 23 cows and in the third group in 30 cows.

This work does not support the view that *Br. abortus* infection predisposes to streptococcal mastitis.—J. E.

I. Cotton, W. E., & Buck, J. M. (1934). **The Status of Vaccination against Bang's Disease.**—*J. Amer. vet. med. Ass.* **84.** 329-340. [15 refs.]

II. Lornie, W. S. (1934). **Some Field Experiences in the Control of Contagious Abortion in Cattle with the Use of a Commercial Dead Vaccine.**—*Vet. Rec.* **14.** 927-930.

III. Haupt, H. (1934). Ist es ratsam, in abortusinfizierten Beständen mit lebenden Abortusbazillen zu impfen? [**Advisability of Live Vaccination in abortus-Infected Herds**].—*Dtsch. tierarztl. Wschr.* **42.** 225-228. [4 refs.]

IV. Teichmann, R. (1934). Zur Bekämpfung der Abortus-Bang-Infektion

durch Impfung. [**Control of Contagious Abortion by Inocula on**].—*Tierärztl. Rdsch.* **40.** 155-156.

I. In this comprehensive survey of the recent developments in vaccination against contagious abortion, Cotton and Buck deal in particular with the investigations carried out by the United States Bureau of Animal Industry. I one herd in which 722 unbred cows and heifers were vaccinated, 13·1 per cent. bsequently aborted ; of 369 animals reserved as controls, 17·7 per cent. abort . In another field trial 149 heifers were vaccinated and 83 left as controls. The a rtion rate in the vaccinated animals was 5·1 per cent. and in the controls 17·9 per cent. These results confirm those of HART and TRAUM, who have carried out carefully conducted vaccine experiments on an extensive scale, in that they point to the efficacy of vaccination for unbred heifers, but show that in unbred cows the vaccine infection occasionally becomes implanted in their udders and is eliminated in the milk.

The Bureau has given increased attention to vaccination during the past few years. It has seemed highly important that more definite knowledge be gained and that either safe and effective ways of artificially immunizing cattle against the disease be perfected or that the use of abortion vaccines be discouraged. These investigations have included studies of calfhood vaccination, of avirulent *Br. abortus* strains as immunizing agents for both bred and unbred cattle, and of strains of low virulence as well as those of normal virulence for comparative purposes only, as immunizing agents for unbred stock. While it does not appear that the disease can be conquered speedily by artificial immunization alone, the information gained through these investigations has lead the authors to believe that vaccination can be made to serve a very useful purpose in combating the disease, especially in herds where testing programmes are recognized as being impracticable or unprofitable, or where they have been abandoned as the result of discouragement on the part of the stock-owners.

Regarding the selection of strains of *Br. abortus* for use as vaccine, the authors state that if avirulent strains are as effective as strains which still possess a low degree of virulence or are even reasonably efficient as immunizing agents, their use would obviously be preferable, not only because they would naturally be expected to eliminate any evil effects resulting from the localization of the vaccinal infection in the udders of lactating cows, but also because their use would render it unnecessary to restrict vaccination to unbred stock, a feature of no little importance from a practical standpoint. It does not appear to have been definitely determined, however, that the immunity-producing power of strains of *Br. abortus* is likely to be retained in a large measure after their pathogenicity has completely disappeared.

Calfhood vaccination was investigated, primarily with the object of determining if immunity to the disease could be imparted to calves and retained to the end of their first pregnancy. One experiment is described in which the results are very promising and indicate that, although the immunity conferred by vaccination during calfhood is of considerable duration, it seems rare for vaccine, even when prepared from a virulent *Br. abortus* strain, to remain for long in the bodies of calves, as judged by agglutination tests of their blood sera.

II. Lornie records the successful application of dead vaccine in combating contagious abortion in 11 herds. A preliminary inoculation of vaccine into all the breeding animals in the herd was followed by another dose 15 days later, after which each animal was treated at three successive stages of pregnancy, namely, at the third, fifth and seventh months. The author recommends two inoculations of vaccine the following year.

III. & IV. Haupt states that the campaign against bovine contagious abortion should proceed with the eradication of the disease and that the use of live vaccine should be discontinued. This view is supported by Teichmann who is of the opinion that vaccination should be confined to heavily infected herds, and that animals exposed for sale should be accompanied by a blood-test certificate.

—S. J. Edwards.

Cotton, W. E., Buck, J. M., & Smith, H. E. (1934). **Studies of Five Brucella abortus (Bovine) Strains as Immunizing Agents Against Bang's Disease (Infectious Abortion).**—*J. Amer. vet. med. Ass.* **85.** 232-247. 2 tables. [3 refs.]

The authors carried out comparative experiments to assess the protective power for cattle of four strains of *Br. abortus* ; two strains were avirulent, and two of low virulence, for guinea pigs.

Vaccines were prepared from 72-hour growths and adjusted to a density ten times greater than tube 1 of McFarland's nephelometer. Each animal received 10 c.c. of vaccine subcutaneously. Seventeen vaccinated in-calf heifers and eight controls were subjected to infection by depositing on the conjunctiva three drops of a suspension of *Br. abortus* 20 times the density of tube 1 of McFarland's nephelometer. Of the nine animals which received the vaccines prepared from the strains of low virulence, 33·3 per cent. were found to be infected at the time of calving or aborting, while, of the eight animals which received the avirulent vaccines, 62·5 per cent. were shown to be infected.

In a second experiment on 37 heifers, the protective power of three strains of *Br. abortus* was tested ; one strain was avirulent ; one of low virulence and one moderately virulent. The results showed that the avirulent strain had, as the result of continued cultivation on artificial media, lost its earlier weak immunizing properties. The attenuated strain conferred good immunity and brucella organisms were not detected in the milk.

The virulent strain also conferred good immunity, but brucella organisms were demonstrated in the milk of one animal.—T. M. Doyle.

Mitchell, C. A., Humphreys, F. A., & Walker, R. V. L. (1933). **Serological Examinations for Brucella Abortus Infection.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* pp. 46-47.

A brief account of experience of routine testing of herds, with a triple test :– tube agglutination, rapid plate agglutination and complement-fixation. Most infected animals react to all three tests.—J. E.

Mitchell, C. A., Humphreys, F. A., & Walker, R. V. L. (1933). **Attempts to Produce an Anti-Serum against Brucella Abortus Infection.** *Rep. Vet. Direct. Gen. Canada 1932-33.* p. 47.

Attempts to obtain a potent antiserum by giving horses large doses of abortin yielded negative results, but the use of live cultures of *Br. abortus* resulted in a potent antiserum with a titre of nearly 1 : 300,000. The work is being continued.

—J. E.

Mitchell, C. A., Humphreys, F. A., & Walker, R. V. L. (1933). **Experiments to Immunize Rabbits to Br. Abortus.** *Rep. Vet. Direct. Gen. Canada 1932-32.* p. 47.

No protection against inoculation with live culture was afforded to female rabbits given (1) subcutaneous injections of abortin, (2) intra-uterine injections

of abortin, (3) subcutaneous injections of killed *Br. abortus* followed by the administration of abortin by the intra-uterine route, or (4) intra-uterine injections of killed cultures.—J. E.

KRANEVELD, F. C., & DJAENOEDIN, R. (1933). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indië. XI. Overzicht over de in 1931 en 1932 aan het Veeartsenijkundig Instituut onderzochte gevallen van osteomyelitis bacillosa bubalorum. [**Anaerobic Infection of Animals in the Dutch East Indies. XI. Osteomyelitis Bacillosa Bubalorum in 1931 to 1932**].—*Ned.-ind. Bl. Diergeneesk.* **45.** 522-537. [English and German summaries]. [For absts. of previous articles of this series, see this *Bull.* **4.** 215, 216 and 503].

An account of nine cases of anaerobic infection affecting the upper parts of the limbs of buffaloes in Sumatra. The causal organism could be isolated from the bone marrow and from the musculature.—A. KLARENBEEK (UTRECHT).

KARUBE, H. (1934). Studien über Toxin von Vibrion septique. [**Studies on *Clostridium septique* Toxin**].—*Jap. J. exp. Med.* **12.** 151-168. 9 tables. [11 refs.] [Orig. in German].

A powerful *Cl. septique* toxin can be prepared by growing the organisms in Weinberg's glucose veal broth. Maximum toxin production occurs after 16 hours' incubation at 37°C., thereafter the toxicity of the filtrate diminishes. The addition of cysteine to the medium accelerates production and retards degeneration of the toxin. It is considered that the toxin and haemolysin of *Cl. septique* are separate entities. Their resistance to heat differs and no constant relation exists between the strength of the two agents in filtrates ; furthermore, they can be separated by filtration methods.—E. J. PULLINGER.

LASSEUR, P., MARCHAL, J. G., & MAGUITOT, C. (1934). Analyse capillaire et isolement des Bactéries dans les mélanges bactériens. [**Capillary Analysis and Isolation of Bacteria from Mixed Cultures**].—*Trav. Lab. Microbiol. Nancy.* No. 7. 105-115. 10 tables. [1 ref.]

LASSEUR, P., DOMBRAY, P., & PALGEN, W. (1934). Fixation des Bactéries par les bandelettes de papier, la pâte de papier et le charbon activé. [**Fixation of Bacteria by Paper, Paper Pulp and Charcoal**].—*Ibid.* 117-121. 8 figs. on 3 plates.

These two investigations are directed to determine whether the methods mentioned are of use in the isolation of organisms from mixed cultures.

The first method is already in use for the isolation of *Bact. typhosum* from other coliform organisms. It is based on the fact that different organisms are attracted to, and ascend with varying rapidity, pieces of ash-free filter paper, which are dipped into fluid cultures, and so form zones along the paper above the medium from which the organisms can be cultivated. The possibilities and limitations of this method are discussed in the light of the authors' experiments.

The second paper discusses the isolation of organisms by adsorption, using such substances as filter paper, paper pulp and charcoal. The experiments showed that there was considerable variation according to the nature of the adsorbing agent and the species of bacteria used.—GWILYM O. DAVIES.

VAN SACEGHEM, R. (1934). Le butaka. [**" Butaka " (Cattle Disease)**].—*Ann. Soc. belge Méd. trop.* **14.** 225-229. [1 ref.]

PIGNEUR [(1932). *Ann. Soc. belge Méd. trop.* **12.** 337.] has described a disease

of cattle due to a bacillus of the colon-typhoid group. van Saceghem examined the strain which PIGNEUR had been using in his vaccine and found it to be a mixture of *B. proteus* [*Proteus vulgaris*] and *Bacterium coli*. van Saceghem asserts that the name " butaka " is applied by the natives to anthrax and blackleg and that it is not applicable to PIGNEUR'S disease. From the bone marrow of cases of " butaka " the author obtained an organism with the cultural and biological characters of *Clostridium chauvoei*. Septicaemic and oedematous forms of blackleg are well known in Africa ; the latter form is associated with the bad " dry season " condition of most local stock in the Belgian Congo.—HARVEY S. PURCHASE.

DISEASES CAUSED BY PROTOZOAN PARASITES.

FRYE, W. W., & MELENEY, H. E. (1934). **Studies of *Endamoeba histolytica* and Other Intestinal Protozoa in Tennessee : VIII. Observations on the Intestinal Protozoa of Young Pigs and Attempts to Produce Infection with a Human Strain of *E. histolytica*.**—*Amer. J. Hyg.* **20.** 404-414. 9 figs. on 1 plate, 1 table. [11 refs.]

An examination was made of the intestinal protozoa of ten young pigs. *Endamoebae* were detected in all the pigs, and specimens of *Iodamoeba*, *Trichomonas*, *Chilomastix*, *Giardia*, *Balantidium* and a coccidium were encountered. Two types of endamoebal cysts were encountered which seemed to indicate the presence of *E. polecki* and *E. debliecki*, but gradations between the two appeared to exist and, although the authors think that probably two species were present, they consider that this point requires further investigation.

A single dose of " heptylresorcinol " 0·6 g. in olive oil in soft gelatin capsules, removed balantidium and ascaris. *Amoeba*, *Chilomastix* and *Giardia* were removed by a ten days' course of " carbarsome " (p-carbamino-phenyl-arsenic acid), at a daily dose of 50 mg. per kg. body weight, given in milk.

All attempts to infect the pigs with a pathogenic strain of *E. histolytica* failed, in spite of feeding on a high carbohydrate diet, and inoculating cultures of the organism into areas of the liver which had previously been treated with boiling water to produce an area of necrosis.—U. F. RICHARDSON.

HU, C. H. (1933). **Histopathology of Kala-Azar in Experimentally Infected Hamsters with Special Reference to Plasma Cells, Myeloid Tissue, Reticulo-Endothelial System and Reticulum Fibers.**—*Chin. med. J.* **47.** 1112-1124. 26 figs. on 13 plates. [15 refs.] [Orig. in English].

In addition to the type of reticulo-endothelial hyperplasia ordinarily depicted, the author describes a spindle cell form, the cells of which contain few parasites and are grouped into nodules which bear a great resemblance to tubercles except for the absence of caseation and multinucleate giant cells. In this form of reticulo-endothelial hyperplasia, the spleen appears to contain numerous small nodules. Both types of hyperplasia may be present in the same animal and even in the same organ.

In addition to the reticulo-endothelial hyperplasia, a marked increase of plasma cells occurs in lymphoid tissue of the spleen, lymph nodes, liver and other organs. The numbers of lymphoblasts and small lymphoid cells do not show a significant change with moderate infection, but with a heavy infection these cells are reduced. No important change occurs in myeloid tissue, except for the presence of large numbers of reticulo-endothelial cells containing parasites and a few plasma cells, but myeloid cells are found in increased numbers in the splenic pulp.

Nucleated blood corpuscles and megalokaryocytes are found in the spleen which appears to exhibit a distinct increase in haematopoietic elements. The increase of reticulum in the spleen is not a constant feature, and is noted mainly in the trabeculae and areas where connective tissue is normally present.

—U. F. Richardson.

Schilling, C., Schreck, H., Neumann, H., & Kunert, H. (1934). **Immunization against Trypanosomiasis.**—*J. trop. Med.* (*Hyg.*). **37.** 70-72.

This article records attempts to immunize horses against *Tryp. congolense* by infecting them as foals by the bites of tsetse flies and enhancing the resistance by repeated reinfection by the same method.

In order to provide a basal immunity, such as is supposed to exist in young game as the result of being born from immune mothers, foals were inoculated with a trypanosome antigen made from rats. In other cases they were either first infected and then given a subcurative dose of " antimosan", or the primary infection was made by inoculation from a latent case of disease. All these methods appeared to be successful, but the results were complicated by a *T. brucei* infection derived from one batch of tsetse. The strain of *T. congolense* which was used for this work was proved virulent for the horse in that it killed an adult horse 66 days after inoculation—U. F. Richardson.

Barrett, R. E. (1934). **Notes on the Epidemiology of Sleeping Sickness with Special Reference to Conditions in the West Nile District of Uganda.**—*E. Afr. med. J.* **11.** 20-28.

The author draws attention to the conditions in the Aringa area of the West Nile district where sleeping sickness did not appear until 1927, in spite of facilities for contact with neighbouring infected areas, and where a sudden decline in the number of cases occurred in 1929. He suggests that the outbreak was associated with famine conditions and that the sudden decline may have been mainly due to the cessation of these conditions.

He considers that the association of the disease with famine may be mainly due to greater human activity in the range for food and the killing of game, with the consequent turning of the tsetse to human beings as a main source of food.

The most heavily infected areas in the West Nile district were the areas most heavily stocked with cattle, and this has been ascribed to occupational causes in that the herdsmen, who are mostly children, are brought in contact with tsetse at watering places. The infection rate in children, however, did not show a higher percentage, as compared to the adult population in these cattle areas, than it did in less heavily stocked areas, and the author ascribes the association of the disease with cattle to the tsetse fly following the cattle from the watering places to the villages.—U. F. Richardson.

Abelein. (1934). Bekämpfung der Trichomonadenseuche. [**Campaign against Trichomonad Infection in Cattle**].—*Dtsch. tierärztl. Wschr.* **42.** 449-453. [2 refs.]

In this article Abelein discusses the methods which can be adopted for the eradication of genital trichomonad infection from an individual herd or groups of small herds using the same bulls. He considers that the difficulty of cultivation indicates that the organism has no saprophytic existence and that the organisms found in stagnant water and stable drains are probably other species of trichomonads. Experience indicates that the only method of transmission is by the act of copulation. He considers that disinfection of cows either before or after service

is impracticable, and that the disinfection of the bull is difficult, whilst the use of irritant lotions renders it " service-shy."

He advocates two methods of eradication which he names the " little plan " and the " big plan." The former consists in separating virgin heifers and cows which have calved normally, and using a known healthy young bull for them. The remaining cows are served by the old bull until such time as they calve normally when they are returned to the healthy division of the herd. This method takes a long time and necessitates keeping extra bulls.

Under the " big plan " the herd is divided into healthy, suspect and infected sections. Suspect animals are kept under observation till they calve normally or exhibit infection. Infected cows are treated by washing out the uterus with 2 per cent. aqueous iodine solution and irrigating the vagina with zinc sulphate solution (1 : 1,000) daily for three weeks. Bulls are treated by disinfection of the prepuce, but experience shows that they sometimes relapse three weeks after apparent recovery and that they should not be used for service until they have remained free from trichomonads for four weeks. This method of eradication should free a herd from trichomonad abortion in four months, but observations should be maintained until all cows have calved normally.—U. F. Richardson.

Witte, J. (1934). Infektionsversuche an Rindern zur Klärung der pathogenen Bedeutung der Trichomonaden für die Sterilität und den Frühabort des Rindes. [**Infection Experiments to ascertain the Pathogenic Importance of Trichomonads in Sterility and Abortion in Cattle**].—*Berl. tierärztl. Wschr.* **50.** 564-566. [7 refs.]

Three healthy young heifers were infected with genital trichomonads by vaginal application of three-day-old pure cultures of the organism grown in blood bouillon. Service by a young healthy bull then followed. Two of the heifers remained sterile whilst the third animal conceived at the fifth time of service. The bull became infected from the heifers and became a carrier of the organisms. The infection of the heifers with a pure culture of trichomonads produced an acute vaginitis which, on recession, left a vaginal catarrh with a thickening of the lymph follicles.—U. F. Richardson.

Daust, E. (1934). Beitrag zur Klinik und Behandlung des Trichomonadenabortes des Rindes. [**Clinical Characters and Treatment of Trichomonad Abortion in Cattle**].—*Tierärztl. Rdsch.* **40.** 465-467, 482-485, 500-505 and 539-540. 2 figs.

This paper reviews the literature dealing with genital trichomoniasis in cattle and records the clinical observations made on 72 affected cattle.

In all cases, swelling of the vulva and a muco-purulent discharge appeared within a few hours of service. This discharge often disappeared a few hours later to reappear in a few days or weeks. Some animals failed to conceive and showed no further symptoms ; others appeared to be in-calf, but after a few months a vaginal discharge sometimes occurred, or the owner sometimes noticed an aborted foetus.

The vaginal discharge may be purulent or watery, containing purulent flakes. The hairs round the vulva and on the under surface of the tail are crusted with dried discharge. The swelling of the vulva may cause considerable pain and restlessness.

On inspection of the vagina, the mucous membrane is found to be inflamed, and on palpation a nodular condition due to enlargement of the lymph follicles is encountered, the nodules often occurring in chains. The external orifice of the

utero-vaginal passage is usually more or less widely open, feels wrinkled and spongy and is covered with a slimy secretion.

On rectal examination, the uterus appears flaccid and atonic, and, if pyometra has developed, hangs deep into the abdominal cavity. The horns are usually enlarged and fluctuating. Three possibilities result from service : (1) failure to conceive followed by regular oesrum and a vaginal discharge ; (2) death of the foetus without expulsion, resulting in large quantities of fluid in the uterus ; (3) expulsion of the foetus with or without the membranes. In this case the membranes and discharges have a peculiar mawkish odour, and the membranes appear to be knotted.

For treatment, it is recommended to flush out the uterus with normal saline, to inject " lentin " subcutaneously to overcome the uterine atony, and finally to wash out the uterus with 1 : 1,000 solution of chinosol. The animal should not be served again for from four to eight weeks.

For detection of trichomonads, the examination of fresh smears is recommended. Organisms which have lost their motility owing to cold can be revivified by heat or light. For staining, undiluted carbol fuchsin is advised.

Experiments carried out to ascertain how long the organisms will survive outside the body indicate that sunlight quickly destroys them. At summer temperature, in urine, in the absence of sunlight, they will survive 12 days. Kept at 1°C., survival for 22 days was recorded in one experiment.

—U. F. Richardson.

Yakimoff, W. L., Gousseff, W. F., & Rastegaïeff, E. F. (1934). Zur Hühnerkokzidiose in Russland (USSR.). III. Mitteilung. [**Fowl Coccidiosis in U.S.S.R. Part III.**].—*Zlb. Bakt. I.* (*Orig.*). **132.** 214-216. 3 tables. [5 refs.]

Coccidiosis is a wide-spread disease amongst fowls in Russia. Three types have been identified by the authors, *Eimeria tenella*, *E. acervulina* and *E. mitis*. The characteristics of these species are recorded. *E. maxima* was not encountered.

—E. J. Pullinger.

Biester, H. E., & Murray, C. (1934). **Studies in Infectious Enteritis of Swine. VIII. Isospora suis n. sp. in Swine.**—*J. Amer. vet. med. Ass.* **85.** 207-219. 13 figs., 7 tables.

Isospora suis n. sp., described here, is the first *Isospora* described in swine. The average dimensions of the oocyst are $16{\cdot}37 \times 11{\cdot}17\mu$ with a standard deviation of 0·56 and 0·74. The morphology and segmentation of the oocyst are described. The infective stage was attained in four days in potassium dichromate solution. After two months in culture, there appeared to be a marked diminution in virulence, but passage was rapidly followed by a return of normal virulence. Clinical manifestations following oral administration, consisting of slight diarrhoea followed by constipation, were not marked. Experimentally infected pigs were killed 6, 9 and 11 days after infection. A lesion was present in the first two, namely, a mild catarrhal inflammation of the mucous lining of the small intestine. The authors decline to enter into a discussion of the endogenous development of the parasite as, in the pigs used, the possibility of immunity from previous infection could not be disregarded. Histological examination of the intestine revealed a destruction of epithelium at the tips and of the substantia propria of the villi. Referring to the pathology of the disease in the summary to the article the authors express the view that " the rôle of this protozoön and the Eimeria as pathogens in swine should not be overemphasized."

Attempts to infect guinea pigs and dogs with viable oocysts were unsuccessful. Negative results were also obtained when *I. bigemina*, the *Isospora* of dogs, was administered to swine.—R. S. Roberts.

I. Biester, H. E., & Murray, C. (1934). **The Occurrence of *Isospora suis* n. sp. in Swine. A Preliminary Note.**—*J. Amer. vet. med. Ass.* **84.** 294.

II. Jospin, M. Y. (1934). Une épidémie de coccidiose sur les lapins d'élevage. [**An Epidemic of Coccidiosis in Domesticated Rabbits**].—*Bull. Soc. Path. exot.* **27.** 403-404.

III. Jankiewicz, H. A., & Schofield, R. H. (1934). **The Administration of Heated Oocysts of Eimeria tenella as a Means of establishing Resistance and Immunity to Cecal Coccidiosis.**—*J. Amer. vet. med. Ass.* **84.** 507-526. 1 fig., 6 tables. [15 refs.]

IV. Kingscote, A. A. (1934). **Coccidiosis in Mink.**—*Rep. Ontario Vet. Coll. Dept. Agric. 1933.* pp. 30-41. 6 figs. [13 refs.]

I. This note refers to the article abstracted above.

II. The author describes an outbreak of coccidiosis in experimental rabbits which followed the purchase of new stock. Mortality in the very early stages affected adult animals but later was confined to the young stock, the adults appearing to have acquired immunity.

III. The experiments described were designed to ascertain the value of feeding with segmented oocysts, heated sufficiently to impair infectivity, to cause the development of resistance in chicks against infection with *E. tenella*. The oocysts used in the immunization process were heated at 48°C. for 15 minutes, before or after segmentation; the lethal time at this temperature is one hour. The results can best be appreciated from the abstract of the authors' table, given below. Only the percentage mortality is shown here, as the other criteria are more or less in agreement with this. The immunizing agents were administered in capsules; the test inoculation consisted of a double dose to each chick – 40,000 segmented oocysts given orally by capsule and 60,000 fed in mash. Groups I and II received one immunizing dose but in the other groups three doses at intervals of five days were given. The test inoculation was administered to all groups on the same date, at an interval of 32 to 34 days after the initial immunizing inoculation.

Group.	Method of immunization.	Chicks used.	Percentage Mortality.
I.	4,000. H.B.S.	13	23·1
II.	18,000. H.B.S.	12	16·7
III.	658. H.B.S. 1,170. H.B.S. 3,200. H.B.S.	25	24·0
IV.	649. H.A.S. 1,100. H.A.S. 3,300. H.A.S.	25	0
V.	649. H.A.S. 560. UNH. 1,800. UNH.	25	0
VI.	Controls	24	62·5

H.B.S. = Oocysts heated before segmentation.
H.A.S. = ,, ,, after ,,
UNH. = Unheated oocysts.

As seen from the table no attempt was made to produce immunity with ascending doses of untreated culture. Details are given of the numbers of oocysts (unheated, heated before, and heated after segmentation) which can be administered with safety as first, second and third inoculations ; finally, a plan of the necessary inoculations for the stimulation of immunity is given and, in this, feeding of 100-150, 400-600 and 600-800 unheated oocysts at intervals of five days is suggested as an alternative to the feeding of heated oocysts.

IV. From the author's examination of relevant literature, coccidiosis would appear to be the most serious disease of mink in captivity. In outbreaks studied by the author, one *Eimeria* and two *Isospora* species have been distinguished. The histology and pathology of cases due to the *Eimeria* are described. The oocyst is very small ; infection experiments with kittens, rabbits and guinea pigs yielded negative results ; it differs in morphology from species parasitic in related hosts. It is therefore assumed to be a distinct species and the name *E. mustelae* is suggested. The symptoms shown were dysentery, progressive emaciation, anaemia and prostration. Lesions were present throughout the small intestine. Cell infiltration of the involved mucosa was not marked in the acute stage. Recovery was incomplete in the majority of cases.

Prophylaxis consists in providing wire-mesh floors and avoiding overcrowding and prolonged residence in one pen.—R. S. Roberts.

Gousseff, W. F. (1934). Zur Frage der Coccidien der Einhufer. [**Coccidia of Solipeds**].—*Arch. wiss. prakt. Tierheilk.* **68.** 67-73. 6 figs., 3 tables. [5 refs.]

This paper records the results of investigations, carried out in various districts of Russia, to ascertain whether equines are subject to coccidial infection : such infection has been reported, but the evidence of the coccidial nature of the parasites described was not considered convincing.

An examination was made of faeces collected from horses, mules, asses and zebra hybrids, and revealed an equine infection varying from 15·8 per cent. in Azerbaijan to 4·56 per cent. in Leningrad. The infection in asses and mules was lower than in the horse.

Two types of coccidia were encountered. One type, for which the author proposes the name *Eimeria solipedum*, exhibited a round oocyst, 15·5 to 28μ in diameter, with no micropyle. No residual body could be detected in the oocysts, but a small polar granule was present.

The second type, for which the name *E. ungulata* is proposed, has an oval oocyst 15·5 to 24μ × 12·4 to 17μ. The oocyst lacks both residual body and polar granule, but a small residual body can be detected in the sporocysts. This second type only differs from *E. deblieckl* of the pig in the absence of a residual body on the oocyst.

The question as to the pathogenicity of equine coccidia has not been investigated.—U. F. Richardson.

Yakimoff, W. L. (1934). Zur Frage der Coccidien der Kamele. [**Coccidia of the Camel**].—*Arch. wiss. prakt. Tierheilk.* **68.** 134-137. 4 figs., 2 tables. [1 ref.]

The author records investigations into the coccidial infections of camels in ten different districts of Russia. The infection rate varied from 2·1 per cent. in Bakhara to 50 per cent. in the Crimea. The oocysts were oval and varied in size from 16·5 to 36·0μ × 12·0 to 27·0μ, the commonest form being 30 × 24μ. A round form of oocyst was also present in small numbers, varying in diameter from 21 to 29μ. Residual bodies were detected in the sporocysts, but not in the oocysts.

There were no polar granules, but a few forms showed a cap resembling *Eimeria faurei* of the sheep. The parasites were thought to belong to the species *E. cameli* which resembles *E. peruviana* of the llama except for the absence of a residual body in the oocyst.—U. F. Richardson.

Sergent, Ed., Sergent, Et., & Catanei, A. (1934). Un type de maladie à prémunition : le paludisme des passereaux à *Plasmodium relictum*. [**A Type of Disease associated with Premunition : Malaria in Certain Passerine Birds caused by** *Plasmodium relictum*].—*Ann. Inst. Pasteur.* **53.** 101-119. 5 figs., 1 table. [72 refs.]

This article records experimental work on malarial infection in canaries with a view to investigating the nature of the "premunity." On recovery from an acute attack a chronic infection persisted ; the birds exhibiting no symptoms, but being subject to relapses which were sometimes fatal. The authors were unable to provoke relapses by the use of cold, heat or adrenalin injections and were only able to demonstrate chronic infection by subinoculation. All cases of resistance to a second inoculation were proved to be due to latent infection and in one case this resistance persisted for over four years. Strains of the organism passaged for purposes of vaccine production did not lose their power of infecting *Culex*. For the conferring of premunity without causing serious disease, blood taken in the incubation period gave satisfactory results.—U. F. Richardson.

Sergent, Ed., Donatien, A., Parrot, L., & Lestoquard, F. (1934). Dix ans de vaccination prémunitive contre les piroplasmoses bovines en Afrique du Nord. [**Ten Years of Vaccination against Bovine Piroplasmosis in North Africa**].—*C. R. Acad. Agric. Fr.* **20.** 169-172. 1 table.

The authors report the occurrence in North Africa of *Theileria mutans* and *Th. dispar*, transmitted by *Hyalomma mauritanicum* ; and of *Piroplasma* [*Babesia*] *bigemina*, *Babesiella berbera*, *Babesiella major* and *Anaplasma marginale*, transmitted by *Margaropus calcaratus* and *Rhipicephalus bursa*. The strains are kept pure by passaging the blood into clean susceptible animals. Immunization against the four pathogenic protozoa is carried out by inoculation with fresh blood. The first inoculation is carried out in the autumn, using *Babesia bigemina*, *Babesiella berbera*, *Babesiella major* and *Anaplasma marginale* : for the second inoculation, carried out four months later, *Theileria* is used. Of 2,657 head of cattle treated in 1932 to 1933, 0·03 per cent. died from the first and 0·49 per cent. from the second inoculation. The survivors stood up to subsequent natural exposure.

—Harvey S. Purchase.

I. Doyle, L. P. (1932). **A Rickettsia-Like or Anaplasmosis-Like Disease in Swine.**—*J. Amer. vet. med. Ass.* **81.** 668-671. 2 figs.

II. Kinsley, A. T., & Ray, J. D. (1934). **Anaplasmosis-Like Disease in Swine.**—*Ibid.* **84.** 391-392. [1 ref.]

III. Dicke, W. E. (1934). **Anaplasmosis-Like Disease in Swine.**—*Vet. Med.* **29.** 288.

I. An apparently undescribed disease of growing pigs three to eight months old was observed in various localities. Its symptoms were in the nature of an ictero-anaemia. Mortality was low, averaging 2 or 3 per cent. The first symptom noted was depression, which was followed by weakness and dyspnoea ; a day or two later icterus and anaemia became apparent. Fever preceded death on the fourth or fifth day of illness.

Post-mortem findings were very characteristic.

" In animals which are moribund, the blood is very pale ; the plasma or the serum is yellowish, and the red cells sometimes show spontaneous agglutination. The blood usually clots fairly readily after it escapes from the body. Icterus is a striking feature of the post-mortem findings. The spleen is greatly enlarged and softer than normal. The liver shows yellowish discoloration ; and the heart muscle and the kidney parenchyma show gross evidence of degenerative changes. Ascites, hydrothorax and hydropericardium, characterized by the presence of yellowish (icteric) fluid, are sometimes found. The contents of the intestine, and even of the stomach, frequently show marked yellowish coloration due to bile pigments."

Histologically, the red blood corpuscles showed inclusion bodies of varied shape, the nature of which was not determined.

II. & III. These are brief clinical reports of a disease in swine. Both authors consider the disease observed by them to be similar to that described by Doyle.—Harvey S. Purchase.

Wiseman, R. H. (1934). **The Nature of Henry's Reaction in Malaria.**—*Lancet.* **227.** 543-544. 1 table. [12 refs.]

The author made tests with Henry's melanin flocculation reaction [see also this *Bull.* **4.** 664.] with sera of human patients. He made parallel tests using distilled water and serum instead of the melanin solution. He reports flocculation in the latter as well as in the melanin tubes and concludes that melanin is not necessary for the development of the reaction, but that it is due to a globulin.

[What may be a similar reaction in veterinary medicine is the mercuric chloride test for camel trypanosomiasis. Horgan & Bennett – (1929). *J. comp. Path.* **42.** 188. – investigated the gelation phenomena which occur when mercuric chloride is added to the serum of camels infected with camel trypanosomiasis in the Sudan and this was due to an euglobulin].—Harvey S. Purchase.

Donatien, A., & Lestoquard, F. (1934). Sur une *Bartonella* nouvelle du boeuf, *Bartonella bovis*, n. sp. [**A New Bartonella of Cattle :** *Bartonella bovis*, **n. sp.**].—*Bull. Soc. Path. exot.* **27.** 652-654. [1 ref.]

This organism was encountered in cattle under observation owing to infection with *Theileria* and *Babesia*. The *Bartonella* appeared as a contamination of eight passages of a strain of *Th. dispar* which was peculiar in that blood forms were not produced, and the success of transmission was judged by the detection of blue bodies in smears from the liver. The animal of the eighth passage showed an acute bartonella infection eight months after the inoculation with the *Th. dispar* strain, and blood from this animal caused attacks of babesia infection followed by the appearance of *Bartonella* in two other animals.

The authors describe the organism as resembling *Bartonella muris* and *Bart. canis*, and appearing as cocci, cocco-bacilli or small rods, the elements being simple, double or in short chains. The cocci are about 0·3μ in diameter, whilst the cocco-bacilli are 0·6 to 0·8μ in length, and the rods 1·2 to 2μ long. One to 20 elements may be present in a single red cell. In some cases 20 per cent. of the erythrocytes may be invaded, whilst in other cases only one infected corpuscle may be encountered after prolonged examination. The incubation period varied from 14 to 53 days, and chronic infection which may be revealed by splenectomy persists for at least eight months, the blood being infective during the whole period. No clinical symptoms were exhibited by the affected animals.

—U. F. Richardson.

Schwetz, J. (1934). Recherches sur les *Grahamella*, les *Bartonella* et les *Eperythrozoon* des rats et des souris de Stanleyville (Congo Belge). (Première

étude). Rats et souris non splenectomisés. [*Grahamella*, *Bartonella* **and** *Eperythrozoon* **of Rats and Mice at Stanleyville, Belgian Congo. Non-Splenectomized Rats and Mice**].—*Ann. Parasit. hum. comp.* **12.** 396-404. 3 tables. [6 refs.]

567 specimens of *Rattus rattus*, examined once, showed a grahamella infection rate of 3·7 per cent., but animals of the same species, kept at the laboratory and examined repeatedly, showed an infection rate of 54·5 per cent. with *Grahamella* and of 18·2 per cent. with *Bartonella*. Rats from some premises showed a heavy rate of infection with *Grahamella*, whilst other premises appeared to be free. Neither *Babesia*, *Hepatozoon*, *Spirochaeta* nor *Trypanosoma lewisi* were encountered in rats.

Mice of the species *Arvicanthus stratiatus* showed a 1·8 per cent. infection with *Grahamella*, whilst those of the species of *Lophuromys ansorgei* showed infection rates of 15·4 per cent. with *Grahamella* and 5 per cent. with *Bartonella*. In this latter species, infections appeared to be readily detectable by a single examination of an affected animal.—U. F. Richardson.

Scharrer, Berta. (1934). Ein serumfreier Nährboden für Hühnerspirochäten. [**Serum-Free Culture Medium for Fowl Spirochaetes**].—*Zlb. Bakt. I.* (*Orig.*). **132.** 243-244. [2 refs.]

Spirochaetes of fowls grow readily in the serum-free medium described by Li Yuan-Po [(1933). *Kitasato Arch.* **10.** 78]. An incubation temperature of 33°C. is recommended.—E. J. Pullinger.

Yakimoff, W. L., & Trummal, F. M. (1934). Zur Frage der Hautspirochätose der Schweine. [**Skin Spirochaetosis in Swine**].—*Arch. wiss. prakt. Tierheilk.* **68.** 138-142. 1 fig. [14 refs.]

This paper records observations on a disease of pigs in Transcaucasia associated with the formation of ulcers round the mouth. The disease sometimes causes destruction of the bones of the jaw and the loss of teeth. Two pigs, kept under observation, died after 43 days. They snorted during feeding and refused food for three days before death. Autopsy revealed emaciation, paleness of muscles and hypertrophy of the spleen. In sections of the ulcers there were numerous spirochaetes which belonged to two morphologically different types. The authors consider that these spirochaetes are probably *Sp. buccalis* and *Sp. dentium* of the mouth which have reached the skin by penetration through the tonsils. References are given to records of similar conditions in pigs in South Africa, Australia, New Zealand, Chile, Japan and the United States of America.—U. F. Richardson.

—. (1934). **Recent Work on Leptospirosis.**—*Brit. med. J.* Oct. 20th. 727. [1 ref.]

In Holland, Weil's disease has assumed considerable prominence during recent years. It is mainly due to *Leptospira icterohaemorrhagiae*, although *L. canicola* has been found as a cause of infectious jaundice in dogs and at least one case of human disease. 60 per cent. of cases show no jaundice, such cases not being fatal. The diagnosis has to be made by the bacteriologist. Contrary to the case in the guinea pig, the parasites are rarely to be found in human blood by dark-ground illumination. Cultivation either directly or following guinea pig injection is more successful. The most useful method is the agglutination test with living organisms or preferably culture in 0·2 per cent. formalin.—Gwilym O. Davies.

Richardson, F. L. (1934). **Studies on Experimental Epidemiology of Intestinal Protozoan Infections in Birds.**—*Amer. J. Hyg.* **20.** 373-403. 1 fig., 4 tables. [25 refs.]

This paper records investigations, carried out with *Trichomonas gallinarum*, *Chilomastix gallinarum* and *Endamoeba gallinarum*, to ascertain the length of time the protozoa would remain infective outside the body, the minimum dose capable of producing infection, and the rapidity of the spread of infection occurring when chickens free from parasites are associated with infected birds. The susceptibility of chickens to the intestinal protozoa of other birds was investigated.

E. gallinarum.—Raw faeces at room temperature remained infective for ten days, whilst diluted faeces remained infective up to 28 days, the longest period tested. A dose of 240 cysts caused the infection of one chicken out of four to which this dose was administered.

Ch. gallinarum.—Raw and diluted faeces were both infective after keeping at room temperature for 40 days. The minimum infective dose was estimated at one cyst. Faecal material in which no cysts could be found, but which contained trophozoites, also proved infective.

T. gallinarum.—Raw faeces, kept at room temperature, were infective for four days, but diluted faeces lost their infectivity in 45 minutes.

Contact infection experiments were carried out by placing infected chickens amongst clean ones kept on floorings of wire or paper. After contact for three weeks 87·5 per cent. of the clean chickens had contracted a trichomonad infection, and 100 per cent. a chilomastix infection. In three experiments on endamoeba transmission the infection results varied between 8 per cent. and 90 per cent. The use of wire flooring did not appear to diminish the risk of contact infection. In general the similar intestinal protozoa of the duck, turkey, goose, pheasant and guinea fowl were found capable of infecting chickens, but failure occurred with some of the protozoa of wild birds. The crow was the only bird without caeca that was found to be affected by trichomonads, and it was considered that this parasite belonged to a new species for which the name *T. corvus* is suggested.
—U. F. Richardson.

Dikmans, G. (1934). **Nasal Granuloma in Cattle in Louisiana. (Rhinosporidium).** —*N. Amer. Vet.* **15.** No. 9. 20-24. 3 figs. [10 refs.]

This article records investigations into a disease of cattle characterized by the appearance of a large number of more or less discrete, sessile elevations covering the nasal septum and turbinate bones and extending into the nasal meati. The disease bore some resemblance to schistostomiasis reported from India and to rhinosporidiosis, a condition recorded in human beings and animals. In sections of the nasal mucosa, aggregates of granules were detected in the walls of the mucous glands and in their ducts. Examination of the nasal secretion revealed the presence of rounded bodies with granular contents resembling the sporangia described as found in cases of rhinosporidiosis, but differing from them in possessing a distinct pore. A resemblance was also detected between the bodies and certain stages of *Histoplasma capsulatum*, a fungus which has lately been shown to be pathogenic for human beings.—U. F. Richardson.

DISEASES CAUSED BY VIRUSES.

Tahsin, S., & Richter, H. (1934). Ueber die Bekämpfung der Rinderpest in der Türkei. [**The Campaign against Rinderpest in Turkey**].—*Tierärztl. Rdsch.* **40.** 537-539. [1 ref.]

The first ordinance dealing with the control of animal diseases in Turkey was

enacted in 1914, prior to which date general instructions issued by Sultan Abdul Hamid in 1893 had provided the only basis for the control of rinderpest. Owing to the great war and the Turkish revolution no serious attention was paid to animal diseases until 1928, when the subject was reviewed and further ordinances and regulations were issued in 1931.

Rinderpest had been prevalent in the southern and eastern provinces, where the people are mainly nomadic, since time immemorial, and from these areas the disease was spread from time to time to the more settled districts by the movement of cattle along trade routes.

According to the official statistics of the last nine years, 39 per cent. of outbreaks had been due to trade movements, 38 per cent. to nomadic movements, 5 per cent. to military operations and 6 per cent. to straying animals. Little success had been obtained by quarantine measures alone, or by these combined with the slaughter of affected animals and the passive immunization of in-contacts with serum. The serum-simultaneous method of active immunization was used for a time, but was discarded in favour of vaccination with a locally prepared vaccine which is said to confer immunity for 12 to 15 months, and to have sufficient keeping qualities. This vaccine has been used for the last two years, and has been so successful that Turkey is now said to be free from rinderpest.

—U. F. Richardson.

Juge, R., & Ton-That-Duong. (1934). Peste bovine expérimentale. Réactions atypiques avec état prolongé d'hypothermie. [**Experimental Rinderpest. Atypical Reactions associated with a Low Body Temperature**].—*Rec. Méd. vét. exot.* **7.** 57-66. 8 charts. [5 refs.]

The authors record atypical reactions to rinderpest inoculation in six calves out of 350 animals which had come under observation during the preparation of rinderpest vaccine. The reactions were atypical in that there was a sudden drop in body temperature, not associated with the onset of diarrhoea, which was not, apparently, a purely preagonal reaction, as in one case the low temperature persisted for the five days prior to the slaughter of the animal. No subinoculations were carried out from these animals, so that it remains uncertain whether they resulted from an idiosyncrasy of the virus or of the individual animals.

—U. F. Richardson.

Bennett, S. C. J., & Evans, J. T. R. (1934). **Cattle Plague Anti-Serum Prepared by Intrarumenal Hyperimmunisation.**—*J. comp. Path.* **47.** 87-93. 1 table. [3 refs.]

The authors carried out comparative tests to assess the relative values of hyperimmune cattle plague serum prepared by intrarumenal inoculation and by intramuscular inoculation of the virus.

The intramuscular inoculation of virus is the routine method employed in the Sudan [and also in Egypt].

Comparative tests on cattle of sera prepared by the two methods proved that the serum prepared by the intrarumenal route was of much lower potency than that prepared by intramuscular inoculation.—T. M. Doyle.

van Saceghem, R. (1934). La séroinfection dans la vaccination contre la peste bovine. [**The Part Played by Serum Infection in Vaccination against Rinderpest**].—*Ann. Soc. belge Méd. trop.* **14.** 231-233. [1 ref.]

A discussion on immunization by simultaneous inoculation with virus and serum, and on whether a thermal reaction is necessary for the development of a durable immunity.

Animals previously inoculated with a formalinized vaccine do not react thermally to inoculation with serum and virus, yet they acquire a strong immunity which is relatively weak. The author also states that the formalinized vaccine only confers a short and slight immunity.—HARVEY S. PURCHASE.

NICOLLE, C., & BALOZET, L. (1933). L'homme est insensible, même sous forme d'infection inapparente, à l'inoculation des virus aphteux des types connus. **[Man is not Susceptible to Inoculation with Foot and Mouth Disease Virus of Known Types].**—*C. R. Acad. Sci. Paris.* **197.** 374-376. [3 refs.]

The authors inoculated nine persons, three each with each separate type of foot and mouth disease virus (A., O. and C. obtained from Prof. RINJARD, Alfort), one subject intradermally in the palm and sole, one into the mucosa of the cheek and into the gums and the third intramuscularly into the thigh. In no case did any lesion develop, though control guinea pigs reacted in the usual manner. No virus could be obtained from the blood of the test persons between the 24th and 72nd hours after inoculation.—J. E.

KLIENEBERGER, E. (1934). **The Colonial Development of the Organisms of Pleuropneumonia and Agalactia on Serum Agar and Variations of the Morphology under Different Conditions of Growth.**—*J. Path. Bact.* **39.** 409-420. 4 text figs., 13 figs. on 2 plates. [8 refs.]

Klieneberger has studied contagious bovine pleuro-pneumonia and agalactia growths on serum agar using Kuhn's agar fixation method. [See also LEDINGHAM, this *Bull.* **4.** 725.] The author confirms the four phase development of these organisms reported by LEDINGHAM. As demonstrated by this method the first stage, from a primary seeding, consists of a mass of filaments with small thickenings. In the second phase, there is a downward and outward growth of filaments and the nodules enlarge. In the third phase, the nodular bodies ripen and there is a further peripheral spread. Finally the bodies in the centre divide up, the ring of bodies ripen and there is a downward growth of the ring. The life cycles of the two organisms are essentially the same with minor specific differences.

The addition of various carbohydrates gave no noteworthy results. The author found that contagious bovine pleuro-pneumonia was the more susceptible to changes in the pH and at pH 6·8 there was little growth. It was found that certain contaminating air diphtheroids had a favourable influence on the growth of the viruses. The addition of a small amount of lithium chloride produced remarkable changes in the size and shape of the two organisms leading to a similarity which further emphasized their close relationship.

The author is not yet satisfied that these viruses should be placed in the family *Actinomycetaceae*.—HARVEY S. PURCHASE.

KIND, G. G. (1934). **Investigation into Horsesickness. II. The Nature of the Immunizing Agents in Formolised Virus.**—*J. S. Afr. vet. med. Ass.* **5.** 25-28. 6 tables. [1 ref.]

The author claims that an anatoxin can be produced from horse-sickness virus. It is extremely sensitive to light, but it is not affected by concentrations of formalin of 1 : 1,000 or below. It is destroyed if the medium is made alkaline with ammonia, or if sodium oxalate is present. Horse-sickness virus can be attenuated by exposure to formalin and subsequent neutralization with ammonia. Attenuated virus is very sensitive to light. Immunity produced by an attenuated virus appears to be established between ten and 21 days after injection. Blood appears to be as suitable as spleen pulp for immunizing purposes.—E. M. ROBINSON.

Nieschulz, O. (1934). Weitere Versuche über die Infektion von Ratten mit Pferdesterbevirus. [**Further Experiments on the Infection of Rats with Horse-Sickness Virus**].—*Zlb. Bakt. I.* (*Orig.*). **132.** 199-203. [2 refs.]

It has been found possible to infect splenectomized rats with the virus of horse-sickness, though normal rats are relatively resistant to this infection. This resistance can also be broken down by the administration of very heavy doses of virus. In the rat, infection is frequently characterized by symptoms of lameness ; death occurs about 15 days after infection. The virus has not been demonstrated in the blood, and it is probable that it is completely neurotropic in the rat. During the process of rat passage, the virus retains its virulence for mice, though there is a lengthening of the incubation period.—E. J. Pullinger.

Cox, H. R., & Olitsky, P. K. (1934). **Prevention of Experimental Equine Encephalomyelitis in Guinea Pigs by Means of Virus adsorbed on Aluminium Hydroxide.**—*Science.* **79.** 459. [5 refs.]

Forty guinea pigs were each given three subcutaneous injections at seven-day intervals of 1 c.c. of virus adsorbed either out of brain tissue or tissue culture on to aluminium hydroxide (which, it is stated, adsorbs up to 99 per cent. of virus from active material). There was no reaction and the animals all resisted a lethal dose of virus inoculated intracerebrally on the tenth day after the last injection, whilst 14 control animals all succumbed. This method is being tried out for the immunization of horses.—J. E.

Howitt, Beatrice F. (1934). **Certain Properties of the Virus of Equine Encephalomyelitis.**—*J. infect. Dis.* **55.** 138-149. 4 tables. [15 refs.]

The virus (Californian strain) was shown to be filtrable and to be approximately 500 $m\mu$ in size. After filtration (Seitz filter) it was found to be virulent even in a dilution of 1 : 2,000, whereas the unfiltered suspension remained infective up to a dilution of 1 : 50,000. 50 per cent. glycerin preserved the virus in brain tissue for one year and a 10 per cent. suspension in saline was found to be more stable than a similar dilution in water. A 20 per cent. virus suspension was not destroyed by exposure for 30 minutes at 16°C., and filtrates and virulent blood also withstood the same temperature for as long as 20 minutes. Virus suspensions withstood freezing for at least 13 months. The virus was sensitive to strongly acid solutions of pH 5·5 and under, but easily withstood a high degree of alkalinity, pH 9·2. It was also comparatively resistant to lysol, merthiolate, corrosive sublimate, chlorinated lime and phenol, but was destroyed by formaldehyde, chlorazene and hydrogen peroxide of proportionate strengths.

It was shown that, in guinea pigs, the urine and faeces were non-infective, but that both the ovaries and teats of such animals contained virus. The ovary of a diseased mare did not contain virus and the difficulty of obtaining infective material from horses during the later stages of the disease was once again demonstrated.

The author concludes with a consideration of certain discrepancies which occur in tests for immune bodies carried out during hyperimmunization.

—Gwilym O. Davies.

Goldberg, S. A. (1934). **The Possible Effect of Irradiation on Equine Encephalomyelitis and on Canine Distemper.**—*Cornell Vet.* **24.** 267-269. [4 refs.]

The author says that the histological picture of the brain in equine encephalomyelitis and in the nervous form of canine distemper is similar to that of encephalitis lethargica in man, and that the latter disease responds well to X-irradiations of

the skull, X-rays being a stimulant of the lymphatic system including the lymphocytes : he therefore suggests that this treatment may be of curative value in the above animal diseases.—J. E.

Oppermann, T. (1934). Der diagnostische Wert der Sublimatprobe bei der ansteckenden Blutarmut der Pferde. [**The Diagnostic Value of the Sublimate Test for Equine Infectious Anaemia**].—*Arch. wiss. prakt. Tierheilk.* **68.** 143-150. [14 refs.]

Hecke, F. (1934). Der diagnostische Wert der Sublimatprobe bei der ansteckenden Blutarmut der Pferde. [**The Diagnostic Value of the Sublimate Test for Equine Infectious Anaemia**].—*Ibid.* 151-156. [15 refs.]

These communications deal with a controversy, between the two authors, as to the value of the sublimate test in equine infectious anaemia. Both authors are agreed that the test may give a negative reading with the sera of affected animals. Oppermann considers that this is comparable with the failure of the tuberculin test in advanced cases, but Hecke points out that, in his work, negative tests were given by 47 per cent. of known infected animals. In Hecke's experiments some 50 per cent. of horses which were clinically healthy gave positive tests ; Oppermann considers that the explanation lies in the fact that the disease is far more prevalent than supposed, and that these positive animals are latent cases. He supports this view by the results obtained when testing slaughter horses, when the *post-mortem* findings agreed with the test results in 98 per cent. of the animals, although clinical symptoms were often absent. Hecke, however, considers that the most reliable proof of the presence or absence of the disease is prolonged observation of the animals, and points out that, on a test of 18 clinically healthy military horses, 56 per cent. gave positive readings. The history of these horses was known, and no cases of infectious anaemia had occurred in this unit for some years.

—U. F. Richardson.

Albrecht, H. (1933). Beiträge zur Technik der Blutuntersuchung mit besonderer Berüchsichtigung der Sublimatprobe (Horgan, Bennett, Kenny-Fulton). [**Contribution to the Technique of Blood Examination with Special Regard to the Sublimate Test – Diagnosis of Equine Infectious Anaemia**].—*Inaug. Diss. Hanover.* pp. 38. 33 tables. [24 refs.]

This paper discusses the diagnosis of equine infectious anaemia which became very prevalent in Germany after the War with the return of the army horses from France and Russia. No method of diagnosis has yet given really satisfactory results, but some success has been claimed for the sublimate test and from differential counts of the blood cells.

The author records investigations carried out with the main object of ascertaining the best method of collecting blood specimens, the length of time such specimens could be kept before examination, and the precautions required to ensure reliable readings. Defibrinated blood did not prove as reliable as serum, the addition of chloroform destroyed the precipitating properties of the serum sublimate mixtures, and it appeared that reliable readings could only be obtained up to the third day after collection. On the whole, the sublimate test gave results which agreed with the *post-mortem* findings.—U. F. Richardson.

Watson, E. A., Plummer, P. J. G., & West, J. R. (1933). **Distemper Studies.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* pp. 42-46. 1 table.

As a result of a severe epizootic of fox distemper on Canadian fur animal farms in 1930 to 1931, a large-scale investigation was planned and begun. This

report describes tests on experimental animals with distemper virus originating from dogs, foxes and minks respectively.

The data from cross-immunity and infection tests are recorded ; foxes were susceptible to fox and dog virus, but not to mink virus, whilst dog puppies were susceptible to dog and mink virus and not to fox virus. There was evidence that the distemper on a mink farm may have originated from dogs, but there was no such evidence with regard to outbreaks in foxes.

The advisability of using dog vaccine, virus and serum to attempt to control distemper in fur animals is discussed and it is suggested that the use of serum alone ought to be permissible.—J. E.

Watson, E. A., Plummer, P. J. G., & West, J. R. (1933). **Epizootic Disease of Arctic "Husky" Dogs.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* p. 46.

At the time of the epizootic of distemper in fur animals [above], a similar disease was reported in sledge dogs and wild foxes of Northern Canada. No material was available for examination to confirm a diagnosis. A veterinary officer travelled to Hudson's Bay trading posts in July of 1932 and left antidistemper vaccine virus and serum for use if necessary during the following winter.—J. E.

Dempsey, T. F., & Mayer, V. (1934). **Canine Distemper Vaccine. Two Experiments with Vaccine Prepared by Photodynamic Inactivation of the Virus with Methylene Blue.**—*J. comp. Path.* **47.** 197-200. 4 tables. [12 refs.]

The authors describe in this paper results of two experiments designed to protect dogs against distemper by means of a vaccine prepared by the photodynamic inactivation of the virus in the presence of methylene blue after the method of Perdrau and Todd [this *Bull.* **3.** 544]. The source of virus was dog spleen obtained from a commercial laboratory in New York and the Perdrau-Todd technique was followed.

In one experiment, in which four dogs received material which had been irradiated for 0, 5, 10 and 20 minutes respectively, only the second in the series developed distemper. Subsequent immunity tests carried out 30 days later showed that only the third in the series was immune.

In the second experiment, comprising various dogs including a control, five were not protected and, of the three which showed no symptoms, only one was subsequently found to be immune. It is concluded that, with this method of inactivation of distemper virus, the antigenic value for dogs seems to be highly sensitive to small differences in irradiation time.

[Note : It is shown by Perdrau & Todd – this *Bull.* **4.** 237. – that in the case of ferrets suffering from dog distemper, even though irradiation was extended to a period far in excess of that ascertained to be the minimum time for inactivation to occur, the antigenic property was not impaired].—G. W. Dunkin.

Holmes, N. J. (1933). **Viability of Rabies Virus in Raw and in Pasteurized Milk.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* p. 51.

"The question is sometimes raised as to the possibility of rabies transmission to Man through the consumption of raw or pasteurized milk of a rabid animal.

"The following experiment was made to determine the viability of rabies virus in raw milk and in milk heated at different temperatures :–

"The brain of a rabid dog was emulsified in cow's milk and the emulsions heated for 30 minutes at temperatures of 50, 55, 60, and 65 deg. C., respectively. With the unheated, and with each of the heated preparations, two rabbits were inoculated subdurally.

" *Results.*—Rabbits inoculated with the unheated emulsion, and with the emulsion heated at 50 deg. C. for 30 minutes, developed rabies and died.

" Rabbits inoculated with emulsions heated to 55 deg. C. and above for 30 minutes, did not develop rabies. They were killed and their brains examined microscopically for Negri bodies, with negative results.

" The virus of rabies in milk is thus destroyed by proper pasteurization."

I. Plantureux, R. (1933). Rage et vaccine. [**Rabies and Vaccinia**].—*C. R. Soc. Biol. Paris.* **113.** 992-993. [2 refs.]

II. Plantureux, E. (1933). Recherches sur le pouvoir pathogène des mélanges de virus rabiques fixes et de virus des rues. Variabilité des propriétés des virus fixes. [**Experiments on the Pathogenicity of Mixtures of Fixed and Street Rabies Virus. Variation in the Properties of Fixed Viruses**].—*Ibid.* 1141-1143. [4 refs.]

III. Jonnesco, D. (1933). Le sort du virus rabique fixe dans le cerveau des Chiens immunisés. [**Fixed Rabies Virus in the Brain of Immunized Dogs**]. —*Ibid.* 1249-1251. [2 refs.]

I. Busson has reported that immunity against vaccinia in the guinea pig also confers a degree of resistance against the street virus of rabies ; using rabbits instead of guinea pigs, the author has been unable to detect any difference of virulence or incubation period in vaccinia-immune or healthy rabbits after the inoculation of fixed or street viruses.

II. When inoculated into the anterior chamber of the eyes of rabbits, mixtures of street virus with the Algiers fixed virus exhibited some of the properties of both components ; infection occurred, due to the street virus, but the incubation period was shortened, due to the fixed virus. These properties were retained for at least five passages of the mixture. When Tangiers fixed virus was similarly tested, however, it was not found to affect the behaviour of the street virus component. The author considers that certain adverse results – the occurrence of rabies following vaccination – attributed to fixed virus or " reinforced " street virus may really be the result of mixtures.

III. In certain experiments on the immunization of dogs, test inoculations have resulted in clinical rabies, although after death no virus could be demonstrated in the tissues. The author contends that, in order to prove autosterilization, the material must be tested on the most sensitive animals ; he describes a case in which brain material, although non-pathogenic when inoculated directly into dogs or rabbits, proved infective when inoculated into guinea pigs, mice and spermophiles ; after passage through the latter animals, the virus in the brain material was, however, infective for dogs and rabbits.—Norman Hole.

Irons, V. (1934). **Cross-Species Transmission Studies with Different Strains of Bird-Pox.**—*Amer. J. Hyg.* **20.** 329-351. 2 tables. [36 refs.]

The author made a comparative study of nine strains of bird pox virus ; three strains were fowl virus, four, pigeon virus and one, turkey virus. In chickens inoculated with pigeon virus the lesions remained localized and recovery was complete at the end of three weeks. The chickens vaccinated with pigeon pox proved on subsequent test to be protected against fowl pox virus.

Irons states that the evidence on the whole appears to indicate that the behaviour of the pigeon virus towards the pigeon and the fowl is to be explained in terms of adaptation of a single agent rather than in terms of a mixture of two different agents.

A strain of fowl pox virus was successfully adapted to pigeons by rapid serial passage on the skin. Evidence of very weak virucidal substances was occasionally found in the sera of hyperimmunized fowls, but the strains of virus studied were all immunologically indistinguishable.

Attempts to adapt bird pox virus to mammals gave negative results.

The fowl was found to be susceptible and the pigeon refractory to artificial infection with the turkey virus. Lesions of vaccinia and fowl pox in fowls were readily distinguishable by examination of the inclusion bodies. Vaccinia virus and fowl pox virus were found to be immunologically distinct.—T. M. Doyle.

Schmid, G. (1934). **Field Observations on Ecthyma Contagiosum of Goats in South-West Africa.**—*J. S. Afr. vet. med. Ass.* **5.** 16-17. 1 fig. [3 refs.]

An outbreak of ecthyma contagiosum affecting about 40 per cent. of a flock of goats is described. The condition showed very little tendency to spread to a flock of Karakul sheep which were in contact with the goats. All the affected goats were white in colour. Wart-like eruptions were seen on the lips which in old cases were covered with dry brown crusts. Large ulcers and erosions were present on the tongue and the buccal mucous membrane was covered with a purulent secretion with an offensive smell. The diagnosis was confirmed by experimental inoculation at the Onderstepoort Laboratory, Pretoria.—E. M. Robinson.

Wakamatsu, Y. (1934). Ueber Versuche mit dem Virus der Hühnerleukose. [**Experiments with the Virus of Fowl Leucaemia**].—*Z. InfektKr. Haustiere.* **46.** 161-176. 2 tables. [36 refs.]

The Engelbreth-Holm strain of fowl leucaemia was found to attack 92·7 per cent. of fowls under experimental conditions. Disease followed an incubation period of six to 20 days and ran a course of one to 17 days. Virus was demonstrable in the brains of infected birds. Virus in bile has a reduced virulence and it is possible to produce some degree of immunity by the intravenous inoculation of infected bile. Transmission of infection by ticks or lice has not been demonstrated.
—E. J. Pullinger.

Thomsen, O., Engelbreth-Holm, J., & Meyer, R. A. (1933). Versuche des Nachweises von spezifischem komplement-bindendem Antistoff bei Hühnern mit experimenteller Leukose (vorzugsweise Erythroblastose). [**Specific Complement-Fixation in Fowls with Experimental Leucosis**].—*Z. ImmunForsch.* **81.** 121-131. 1 table. [8 refs.]

Using haemoglobin-free cell extracts (i.e. extracts of erythroblasts and myeloblasts) as antigen, it was found that the sera of 20 per cent. of fowls artificially infected with leucosis were capable of fixing complement. This fixation may depend upon a virus anti-virus union or upon a union between cellular elements and cell antibody.—E. J. Pullinger.

Andrewes, C. H., Laidlaw, P. P., & Smith, W. (1934). **The Susceptibility of Mice to the Viruses of Human and Swine Influenza.**—*Lancet.* **227.** 859-862. [5 refs.]

—. (1934). **Influenza Virus : A Further Advance.**—*Ibid.* 879-880. [1 ref.]

—. (1934). **The Mouse and Influenza Virus.**—*Brit. med. J.* Nov. 3rd. 817. [2 refs.]

The authors have previously shown that the prime cause of human influenza is a virus and that infection can be transmitted to the ferret. They believe that this virus is identical with or closely related to Shope's swine influenza virus.

Pursuing these investigations with the swine influenza virus, the authors have

now shown that infection can be transmitted to mice by intranasal inoculation. The disease, however, is characterized by lesions in the lungs, as in the ferret, rather than in the nasal passages, as in the pig. A severe and sometimes fatal disease is set up, no concomitant bacteria being necessary.

When these experiments were repeated with the human virus similar results were obtained, and cultural and filtration experiments left no doubt that the disease was a virus infection. It has yet to be shown that the mouse can be infected directly from man.

Both viruses passed through a 0·6μ gradocol collodion membrane and both viruses were neutralized by corresponding antisera produced in other animals. Mice could not be infected with the swine or human strains by any method of injection other than by direct introduction into the respiratory tract.

The second and third references are annotations of this paper.

—Gwilym O. Davies.

Sabin, A. B. (1934). **Studies on the B Virus. I : The Immunological Identity of a Virus Isolated from a Human Case of Ascending Myelitis Associated with Visceral Necrosis. II : Properties of the Virus and Pathogenesis of the Experimental Disease in Rabbits.**—*Brit. J. exp. Path.* **15.** 248-268 and 268-279. 14 tables. [29 refs.]

The infective agent known as B virus [Sabin & Wright (1934). *J. exp. Med.* **59.** 115.] isolated from man, which is pathogenic for monkeys, guinea pigs and mice, has been compared with Aujeszky's disease (infectious bulbar paralysis, pseudorabies, mad itch) and other viruses. Clinically and pathologically, Aujeszky's disease has much in common with B virus, but can be distinguished from it by the greater virulence and constant occurrence of " itching " associated with the former. Cross-immunity experiments indicated that guinea pigs and monkeys immune to B virus resisted minimum doses of the virus of Aujeszky's disease, but the immunity was only partial, i.e., there appeared to be some group relationship between the two viruses. Quantitative neutralization tests also revealed a partial cross-protection between B virus and that of herpes.

No relationship was found between B virus and virus III or vaccinia.

Experiments in the rabbit indicated that the skin lesions induced by B virus are characterized by a haemorrhagic necrosis and can thus be distinguished from herpes and Aujeszky's disease. The course of the experimental infection suggested that the virus reached the central nervous system by way of the peripheral nerves. The virus was readily filtrable through Berkefeld " V ", " N " and Chamberland L_3 candles, but not through a double-disc Seitz.

The induction of the disease following corneal, intramuscular and intravenous injection is discussed.—R. E. Glover.

Megaw, J. (1934). **Typhus Fevers in the Tropics.**—*Brit. med. J.* Aug. 11th. 244-246.

The author discusses the unsatisfactory nomenclature of the human typhus (virus) fevers and proposes to abolish the use of place names and names based on the character of the syndrome and to substitute a few names based on the invertebrate vector.

Megaw divides typhus fevers into epidemic and non-epidemic forms : that transmitted by lice is an epidemic typhus and non-epidemic typhus includes those types transmitted by ticks, mites, fleas and certain other vectors. A list of 27 types of typhus coming into this classification is given. [The dog acts as a reservoir of virus for Marseilles endemic typhus – this *Bull.* **4.** 430].—J. E.

INVERTEBRATE VECTORS OF DISEASE.

Christiansen, M. (1934). Argas reflexus Latreille (Duemiden) i Danmark. [*Argas reflexus* **Latreille in Denmark**].—*Maanedsskr. Dyrlaeg.* **46.** 6-15. 3 figs. [4 refs.]

The presence of *Argas reflexus* Latreille, hitherto unrecorded in Denmark, was discovered in a Copenhagen pigeon loft in April, 1930. It is believed to have been introduced by racing pigeons or pigeon baskets from abroad.

—A. A. Forsyth.

Bos, A. (1934). Beitrag zur Kenntnis der Geflügelpockenübertragung durch Mücken und andere Arthropoden. [**The Transmission of Fowl Pox by Flies and Other Arthropods**].—*Z. InfektKr. Haustiere.* **46.** 195-259. 1 fig., 2 tables. [46 refs.]

It is not possible to do justice to this article in an abstract; those who are interested are referred to the original.

The literature is discussed, and details of the experimental procedures are recorded. In 36 out of 56 transmission experiments it was shown that species of mosquitoes were capable of transmitting infection by means of bites. 295 mosquitoes of the species *Culex pipiens*, *Aedes argentus*, *Theobaldia annulata* and *Anopheles maculipennis* were studied and all species were capable of acting as transmitting agents. Mosquitoes were able to transmit as long as 75 days after becoming infected. Those infected in the winter could transmit infection in the following spring. One mosquito could infect several birds in succession once it had acquired the virus. Transmission of virus from mosquito to mosquito by heredity or during copulation was not demonstrated. Virus could be found in all organs of the mosquitoes at certain stages, with the exception of the wings. The proboscis remained infected from the time of feeding up to 185 days. No non-infective stage of the virus was demonstrated, nor was any developmental cycle within the mosquito noted. These insects acted purely as mechanical transmitting agents.

Flies (*Stomoxys calcitrans*), bugs (*Cimex lectularis*), and ticks (*Argas persicus* and *Ornithodorus moubata*) can all act as transmitters of the virus though these arthropods do not retain infection as long as the mosquitoes. Mites did not act as transmitters.

Infection of fowls by arthropods was generally followed by the epithelial type of the disease, the incubation period being between three and 12 days, and running a course of three to six weeks. Mortality was low: but of 83 hens on which infected mosquitoes were fed, those which gave good or moderate reactions were resistant to subsequent artificial infection, whilst the majority of those giving no reaction subsequently showed normal susceptibility.—E. J. Pulinger.

DISEASES CAUSED BY METAZOAN PARASITES.

Bhatia, H. L. (1934). **The Bot Flies of Goats and Sheep.** *Agric. Live-Stk India.* **4.** 516-523. 14 figs. on 2 plates. [10 refs.]

Bhatia gives a description and account of the life histories of the bot flies of sheep and goats, with a brief discussion of their economic importance and the methods of treatment and control. The paper deals particularly with *Oestrus ovis* and *Hypoderma crossi*; brief mention only is made of *H. lineatum*, the cattle warble fly, which also occurs in goats.

In North-West India the occurrence of warbles in goats is more especially confined to the hilly districts, and is most prevalent during the warmer months of the year. The annual loss due to damage in skins has been estimated at 4·5 million rupees and in addition a certain number of carcasses may be rendered unfit for food.

Among the control measures mentioned for warbles are derris powder, tobacco dust and lime mixtures. For the prevention of *O. ovis* infestation dark curtained sheds are recommended for small flocks, while for large flocks on extensive ranches it is recommended that they be driven long distances from the place where the larvae left them so that when the flies emerge the sheep are at such a distance as to be safe from attack.—J. S. Steward.

McIntosh, C. W. (1933). **Cattle Warbles.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* pp. 51-52.

An attempt to immunize calves by an injection of warble larval extract yielded negative results. A saturated solution of common salt was tested as a larvicide by application to the backs of cattle ; it was found to be of negligible value.—J. E.

Lewis, E. A. (1933). **Observations on Some Diptera and Myiasis in Kenya Colony.**—*Bull. ent. Res.* **24.** 263-269. [13 refs.]

Although deaths in human beings or animals from true myiasis are few, there are to be found many forms of myiasis and allied parasitisms in Kenya due to the numerous species of " maggot " and " blowflies " which exist there, i.e. *Lucilia cuprina* Wiedemann, *L. sericata* Meigen, *Chrysomyia* [*Cochliomyia*] *chloropyga* Wiedemann, *C. marginalis* Wiedemann, *C. bezziana* Villeneuve, *Calliphora antarctica* Schin, *Sarcophaga haemorrhoidalis* F., *Cordylobia anthropophaga* Grünberg, *C.* (*Stasisia*) *rodhaini* Gedoelst, *Cordylobia* sp., *Auchmeromyia luteola* Fabr., *Muscina stabulans* Fln., *Synthesiomyia nudiseta* Stein, *Oestrus ovis* L., *O. variolosus* Loew, *O. asininus* Brauer, *Gastrophilus intestinalis* de Geer, *G. nasalis* L., *G. pecorum* F., *G. haemorrhoidalis* L., *G. ternicinctus* Gedoelst, *Gastrophilus* sp., *Gyrostigma meruense* Sjöstedt, *Gedoelstia cristata* Rodhain and Bequaert, *G. hassleri* Gedoelst, and *Hypoderma* spp.

The author has reported on 25 species of flies occurring, or reported to have been collected, in Kenya.

Hypoderma spp. have apparently failed to establish themselves, although at one time in the past cattle imported from Britain proceeded immediately up country to be quarantined on the owner's premises : these cattle may have been infested. All warble flies are now removed and destroyed whilst the cattle are in the quarantine camp at Nairobi.—Harvey S. Purchase.

Bonnet, A., & Timon-David, J. (1934). Recherches sur les acariens plumicoles. (Troisième note). [**Feather Mites. III.**]—*Ann. Parasit. hum. comp.* **12.** 257-266. 8 figs., 2 tables. [1 ref.]

This paper is a report of the authors' continued studies of the acarines found on domestic and wild birds in Provence and the Pyrenees.

A table of the parasites observed and the various hosts is appended.

—Harvey S. Purchase.

Skriabine, K. J., & Schulz, R. S. (1934). La lutte contre les helminthoses des volailles. [**The Control of Helminthiasis in Poultry**].—*Bull. Off. internat. Epiz.* **8.** 379-413. 3 figs.

This paper gives a general account of poultry parasitism in Russia ; a list

appears of the parasites which have been observed in chickens, geese and ducks, and some mention is made of the pathological conditions which some of the species are capable of causing, but there is no account of specific outbreaks.

Mass treatment is recommended, in conjunction with good hygienic measures, for the control of the various parasites and an account is given of observations on the value of anthelmintic treatment, particularly for *Ascaridia*. Carbon tetrachloride, tetrachlorethylene and nicotine have been found to be effective for the removal of this parasite, carbon tetrachloride being the best of the three. The value of carbon tetrachloride for *Amidostomum* in geese was also confirmed and some success was obtained with arecoline hydrobromide for the expulsion of *Raillietina tetragona*, but no satisfactory treatment was found for *Heterakis* or *Capillaria*. Duplicating the runs and alternating their use by the fowls is recommended as a means of eliminating infection from the ground.—E. L. Taylor.

Fairley, N. H. (1933). **The Bilharzia Complement-Fixation Reaction in Goats infected with *Schistosoma mattheei* and *Schistosoma bovis*.** *—J. Helminth.* **11.** 181-186. 2 tables. [11 refs.]

The complement-fixation reaction with antigen prepared from an alcoholic extract of the livers of *Planorbis exustus* infected with the cercariae of *S. spindale*, which has given such excellent results in several specific mammalian schistosome infections, was tried on goats infected with *S. mattheei* and *S. bovis*. Five of seven goats harbouring *S. mattheei* and all of four goats exposed to alimentary infection with *S. bovis* gave positive results. The sera of non-infected goats and of three goats exposed to infection with *S. mansoni* gave negative results. It is considered that goats are naturally resistant to infection with *S. mansoni*.

The author concludes by saying that " the complement-fixation reaction with cercarial antigen (*S. spindale*) has now been applied to infestation with three human and four cattle schistosomes, and its group applicability to mammalian schistosomiasis may be regarded as proven."—E. L. Taylor.

Cawston, F. G. (1933). **Schistosomes in South African Stock.**—*Vet. Rec.* **13.** 1178-1179. 2 figs.

Cawston reports the finding of schistosome eggs resembling those of *S. bovis* in human urine, but feels that he would not be justified in concluding that an infestation of that worm must have been present and that sheep and cattle are a danger to human beings.

[MacHattie, Mills and Chadwick (1933). – this *Bull.* **4.** 362. – investigated this possibility and concluded that the occurrence of schistosome eggs resembling *S. bovis* in human urine is due to some abnormality in the formation of the egg shell of *S. haematobium*, and that sheep and cattle are not a potential reservoir of human urinary schistosomiasis].—E. L. Taylor.

Lane, C. (1934). **The Prevention of Ascaris Infection : A Critical Review.** *Trop. Dis. Bull.* **31.** 605-615.

The literature which the author reviews is that dealing with the conditions under which the infective larva develops within the ascaris egg, with its mode of re-entry into the host and, briefly, with the migrations of the young larva within the host. It is pointed out that evidence of some biological difference existing between the human and the porcine strains of *A. lumbricoides* is very scanty and that it is not possible to disregard the pig as a potential source of ascaris infection in man. Alternate drying and moistening frequently results in the hatching of the eggs and the author thinks it possible that not only is infection occasionally brought

about through skin penetration by the larvae, but that the breathing in of dry embryonated eggs may be a fertile source of infection.—E. L. Taylor.

Harwood, P. D. (1934). **An Anomalous** *Ascaris lumbricoides* **from Swine.**—*J. Parasit.* **20.** 314-315. 1 fig.

Compared with the frequency of their occurrence in flat worms, anomalous structures in nematodes are rare. A female *A. lumbricoides* is described which possessed a second head, about 2 mm. from the anterior end, there being three lips (rather imperfectly formed) and an oesophagus which communicated with the main oesophagus.—E. L. Taylor.

Liebsch, W. (1934). Zu den Wurmknöten im Rinderdarm. [**Worm Nodules in the Intestines of Cattle**].—*Z. Fleisch- u. Milchhyg.* **44.** 265-268. 3 figs. [7 refs.]

Minute worms found in nodules in the small intestine of cattle more than 50 years ago and described under the name *Ancylostoma bovis* were subsequently thought to be immature oesophagostomes. After making a study of the nodules and the minute worms (1 to 3 mm. long) which many of them contain, Liebsch concludes, however, that two species are represented. The genital organs of these larvae were quite undeveloped and search failed to reveal the adult worms, so that it is not possible to say what genera or species they represent.—E. L. Taylor.

Gmelin, W. (1934). Ein Beitrag zur Frage der Anämie und Kopfkrankheit der Pferde. [**On the Problem of Anaemia in the Horse**].—*Berl. tierärztl. Wschr.* **50.** 529-531. 1 fig. [9 refs.]

Filtered extracts of ascarid worms were inoculated intravenously into rabbits, 12 doses of 0·5 to 5·0 mg. each being given within 30 days. At autopsy the experimental animals showed anaemia, leucocytosis and eosinophilia. Microscopical examination of the liver showed leucocytic infiltration, including the presence of eosinophiles, erythrophagocytosis and other changes. Similar investigations were carried out with extracts from strongyle worms and similar results were obtained.

The noxious substances produced by helminths give rise to anaemia and other symptoms and the question to be decided is whether it might be possible to produce an active or passive immunity against or a tolerance for these substances.

—E. J. Pullinger.

I. Ono, S. (1933). **Studies on the Life-History** of *Spiruridae* **in Manchuria. I. The Morphologic Studies on the Encysted Larvae Found in 2 Species of Dung-Beetle, Dragon-Fly, Hedgehog, Domestic Fowl, and Duck, as well as their Infestation Experiments with Rabbits and Dogs.**—*J. Jap. Soc. vet. Sci.* **12.** 165-184. 19 figs. on 4 plates, 14 tables. [3 refs.] [Abst. from English summary].

II. Datta, S. C. A. (1933). **The Etiology of Bursati.**—*Indian J. vet. Sci.* **3.** 217-236. 13 figs. on 6 plates. [66 refs.]

III. Descazeaux, & Morel. (1933). Diagnostic biologique (xénodiagnostic) des Habronémoses gastriques du cheval. [**Biological Diagnosis of Gastric Habronemiasis in the Horse**].—*Bull. Soc. Path. exot.* **26.** 1010-1014. [1 ref.]

IV. Descazeaux, & Morel. (1933). Rélations entre les habronémoses cutanées et gastriques du cheval. [**Cutaneous and Gastric Habronemiasis in the Horse**].—*Bull. Acad. vét. Fr.* **6.** 364-367. 1 table. [1 ref.]

I. In a previous paper Ono showed that a species of dung beetle (*Gymno-*

pleurus mopsus) acts as the intermediate host of *Spirocerca sanguinolenta* of the dog in Manchuria. The present paper is a summary of further work.

Spirocerca larvae were found in the following species :- *Gymnopleurus mopsus* (71 per cent.), *Scarabaeus sacer* (75 per cent.) and dragon-fly (28 per cent.). Larvae were found in the intestinal walls of four ducks and in the stomachs, intestinal walls and mesenteries of four hedgehogs. 63 per cent. of fowls harboured the larvae in their crops and intestinal walls.

The structure of the larval cyst differs according to the host.

In the white rat the encysted larvae, when ingested, re-encysted in the stomach wall without further development. In the rabbit, the larvae invaded the wall of the aorta, as in the dog, and underwent further development.

II. A general account of bursati is given and a good description of its histology. The changes found in the " kunkurs " [circumscribed hard or gritty areas] are histologically similar to those found in gastric habronemic abscesses and other kinds of worm-caused nodules. The Indian condition was compared with material from the cutaneous habronemiasis affecting equines in Greece. The two conditions were noted to be identical in histological features and in the characters of the parasitic larvae. The larvae were found in most of the bursati material examined and in those cases where larvae were not seen the failure was said to be due to lack of complete serial sections. The incitant larva is most probably *Habronema muscae*.

From the observations of the author and of other workers on the course, distribution and occurrence of bursati, it is evident that the condition is not a mere local infection. The causative larvae have strong migratory powers and the lesions would appear to be usually produced through the general circulation, wound infection playing an insignificant role.

III. The eggs of species of *Habronema* measure 50 to 60μ long by 8 to 10μ wide and cannot be distinguished. If eggs of the house-fly are placed on a suspected portion of faeces, the larvae can later be found in the adult flies which result, and can then be differentiated. The full technique is given.

IV. The above method was used with success on 12 horses, six with " summer wounds ", three with ordinary wounds and three with no wounds, *H. megastomum* and/or *H. muscae* being found in every case. It appears probable, and has been proved experimentally, that flies infested by *Habronema* larvae in faeces can give rise to lesions of cutaneous habronemiasis when placed on wounds. There appears, therefore, to exist a connection between gastric and cutaneous habronemiasis and for their joint control it is important to prevent fly larvae from becoming infested by *Habronema* larvae in horse faeces as well as to keep wounds free from flies.

For the treatment of cutaneous habronemiasis the authors recommend " novarsenobenzol " in a powdery, liquid or fatty base.—A. W. N. Pillers.

Hemmert-Halswick. (1934). Trichinen in der Muskulatur. [**Trichinae in the Musculature**].—*Arch. wiss. prakt. Tierheilk.* **68.** 33-41. 11 figs.

The author gives a general account of trichinae in the muscles, and of the various theories as to the route by which the young trichinae travel, why they choose certain sites, the building of the capsule, and the comparison of the capsule with the Miescher's tubes of sarcosporidia. The swelling of muscle fibres to eight times the normal diameter and the destruction of the nuclei are regarded as of considerable importance in the detection of young trichinae in muscle, before the capsule has begun to form. The paper is illustrated by particularly fine photomicrographs, one showing young trichinae in heart muscle.—E. L. Taylor.

IMMUNITY.

TUFT, L., & MULROONEY, Mary. (1934). **The Effect of Reticulo-Endothelial Cell Blockade upon Antibody Formation in Rabbits.**—*J. Immunol.* **27.** 63-80. 4 tables. [25 refs.]

As an attempt to find out the part played by the reticulo-endothelial system in antibody production, rabbits were inoculated with large doses of substances such as India ink and trypan blue, which are readily phagocytosed by the reticulo-endothelial cells. When these cells were saturated, three inoculations of mixed typhoid vaccine were given to these rabbits and to untreated controls. The rabbits were bled before inoculation of blockading substance, before inoculation of vaccine and at intervals after vaccination, and agglutination and complement-fixation tests were carried out. Periodic inoculations with blockading substance were given to ensure that the cells were kept saturated throughout the experiment, though care had to be taken not to give too much, as this led to a high mortality before an experiment could be completed.

In the blockaded rabbits, little or no antibody formation was demonstrated, whereas, in the controls, antibody production was well marked.

A subsequent histological examination of various tissues showed the endothelial cells to be infiltrated with the blockading substance.—A. BROWNLEE.

BAUMGARTNER, Leona. (1934). **Age and Antibody Production. I. Qualitative Changes in Antisera Associated with Age.**—*J. Immunol.* **27.** 407-416. 2 tables. [6 refs.]

This paper recounts a series of experiments devised to estimate the comparative speed or " avidity " of reactions between antibody and antigen in animals of different ages. Rabbits were used in the experiments and these were grouped as young, adults and aged.

It was shown that definite qualitative and quantitative differences existed which suggested that there was a curve of development in the ability to produce antibodies.

The " avidity " of fresh antisera produced in adult animals was greater than that produced in young animals but only a little greater than that produced by aged animals. Furthermore the quantity produced by young animals was less than that produced by adults. Aged animals also appeared to be less able to produce antibody than adults.—GWILYM O. DAVIES.

GERLOUGH, T. D., & WHITE, W. (1934). **Some Factors Influencing the Rate of Thermal Destruction of the Tetanus Antitoxin of Antitetanic Horse Plasma at 60°C. to 66°C.**—*J. Immunol.* **27.** 367-377. 2 figs., 5 tables. [5 refs.]

The following are the results of a systematic investigation of the effect of pH and the concentration of phenol on the destruction of antitetanic horse serum in varying concentrations of ammonium sulphate.

The pH of maximum stability is at or near neutrality. Phenol accelerates antitoxin destruction, the acceleration being approximately proportional to the square of the phenol concentration. The addition of neutral salts increases the rate of destruction up to a maximum reached at an ionic strength of 0·6 to 0·9. Thereafter the rate decreases.

The rate of destruction is also increased 1·85 times for every increase of 1° between 60° and 66°C.—GWILYM O. DAVIES.

Kaiser, M., Gherardini, Maria, & Michna, H. K. (1933). Ueber die vaccinale Immunität von Kühen. II. Mitt. [**Vaccinal Immunity of Cows. Part II**]. —*Z. Hyg. InfektKr.* **115.** 687-704. 1 fig., 6 tables.

As the result of the vaccination of 240 cows and the revaccination of 116, it has been ascertained that two streaks of inoculation in the perineum serve to give cows an immunity to cow pox lasting one year. Of a group of 175 bovines vaccinated with diluted lymph having a titre of 1 : 1,200, 96 showed a maximum reaction on the sixth day, whilst some showed it as early as the fourth and two as late as the tenth day. Three groups of 32, 39 and 45 animals from the foregoing group were revaccinated. Two groups received different dilutions of the same vaccine whilst the third group received testicular lymph of low titre. Of the first two groups, 51 per cent. showed early reactions [i.e., traumatic reactions], 42 per cent. showed inflammatory reactions and 7 per cent. scab formation. None gave entirely negative reactions. Comparing the values of high and low strength lymph, the former gave a delayed and inflammatory reaction rather than a traumatic one ; its more general use is, for this reason, advocated. The animals which received testicular lymph showed but little resistance when subsequently subjected to infection.—E. J. Pullinger.

Duncan, J. T. (1934). **Optimal Agglutination : The Significance of the Different Ratios of Serum to Bacteria.**—*Brit. J. exp. Path.* **15.** 23-44. 8 tables. [15 refs.]

Three different criteria may be used in taking comparative readings of agglutination reactions and are referred to in this paper as " A ", " B " and " C ".

The " A " series consists of the determination of the optimal or most rapidly progressive ratio of serum to bacterial suspension when a series of falling doses of agglutinating serum is titrated against a fixed dose of bacterial suspension. This is comparable to the Ramon method of titrating diphtheria antitoxin and toxin.

The " B " series consists of determining the position of optimal agglutination, when a series of falling doses of bacterial suspension is titrated against a fixed dose of agglutinating serum and is analogous to the Dean and Webb method of determining the optimal ratio of serum antigen to antiserum.

The " C " series consists of the determination of the highest serum dilution at which complete agglutination occurs after 24 hours' incubation.

At a salt concentration of M/7 all three ratios bear a constant relation to one another. Working mainly with *Bact. dysenteriae* Flexner " Z " and its homologous serum, " A " ratio showed approximately eight times the serum/suspension of " B " ratio and the " B " ratio gave twice the serum/suspension proportion of the " C " ratio.

The " A " ratio does not correspond to the maximum amount of attached antibody but it suggests that it is the point at which the antibody just forms a complete film over the organism and, therefore, gives a measure of the smallest amount of antibody which will completely neutralize every antigenic particle. It is not suitable as a guide to the appropriate dose of suspension for use in fractional antibody absorption.

The " B " ratio is dependent upon two opposing forces, e.g., the increased contacts between sensitized organisms proportionate to the increase in their number and the fall in the degree of sensitization of the individual bacilli coinciding with the fall in the serum suspension ratio. It is assumed that little more than one-eighth of the surface of the antigen is covered at the " B " ratio which renders it unsuitable as a guide to the neutralizing dose of antibody, although it may be

more suitable than " A " as a guide to the determination of the dose of bacteria to be used in fractional absorption.

The " C " ratio is presumably at the point where every organism carries the minimum sensitizing dose of antibody. The true end-point appears to be given only by an optimal concentration of salt which may vary with different species of bacteria. This ratio, properly determined, may be a guide to the appropriate dosage of bacteria to be used in absorption reactions.—R. Lovell.

Donham, C. R., & Fitch, C. P. (1934). **Rapid Agglutination Test for Infectious Abortion in Cattle.**—*J. infect. Dis.* **55.** 60-71. [19 refs.]

The authors have studied various methods for the preparation of antigen for the rapid agglutination test for the diagnosis of contagious abortion. They found that washing the organisms with phenolized saline solution rendered the antigen slightly more sensitive than when unwashed bacteria were used.

Sera that show pro-agglutinoid zones by the test tube method do not show such reactions by the rapid method. Variations in the sensitivity of antigens for the rapid test were encountered when different strains were used, but variations in sensitivity of different lots of antigen were also noted even when a single strain of the organism was employed.

In view of the existence of " slow agglutination " of rapid test antigen, two or three minutes is too short a time for making the final readings.—T. M. Doyle.

Gough, G. A. C. (1934). **The Purification of Tuberculin.**—*Brit. J. exp. Path.* **15.** 237-242. [11 refs.]

The author has studied the skin specific fractions in " old tuberculin " which he has attempted to purify by chemical means and by adsorption. Preliminary work with protein picrates was only partially successful, since a proportion of the active fraction remained in the soluble portion. Adsorption on benzoic acid, on the other hand, proved very effective.

" The medium (14 l.) was adjusted to pH5–4·5 by the addition of glacial acetic acid (about 160 c.c.) and the precipitated material (8 g.) removed by decantation and centrifugation. A solution of sodium benzoate (68 g. benzoic acid in 300 c.c. 2 *N*-sodium hydroxide) was then added to the clear filtrate and 3 *N*-hydrochloric acid. . . . The dry material was freed from benzoic acid by suspension in acetone (2,500 c.c.) (260 c.c.). . . ."

A solution containing 5 mg. per c.c. was twice as active as the International Standard.

It was also found that treatment of " old tuberculin " with trichloroacetic acid gave one active fraction while further precipitation of the residual liquid with ammonium sulphate gave a second active portion which was of a proteose nature. The specific substance was filtrable through a membrane of A.P.S. 9 $m\mu$, but was retained by one of A.P.S. 5 $m\mu$.—R. E. Glover.

DISEASES, GENERAL.

I. Gordon, W. S. (1934). **The Control of Certain Diseases of Sheep.**—*Vet. Rec.* **14.** 1-12. 7 figs., 6 tables. [25 refs.]

II. Taylor, H. (1934). **Scrapie in Sussex.**—*Ibid.* 451-452.

I. Apart from the author's introductory and concluding remarks, this paper contains an account of the immunological measures used in the control of braxy, lamb dysentery and " louping ill ", with brief comments on tick-borne fever and the less prevalent anaerobic infections.

In the 1932 to 1933 season, records obtained for sheep vaccinated against braxy with formalinized whole culture showed a mortality of 0·75 per cent. in 19,328 sheep vaccinated without controls and, where controls were kept, a mortality of 0·8 per cent. in 3,588 vaccinated sheep and 8·4 per cent. in 1,886 control sheep. A summary of results obtained in field trials with lamb dysentery serum showed a reduction of mortality from 17 to 1 per cent. in 1927, and from 20 to 1 per cent. in 1928, while the immunization of ewes reduced the mortality in lambs from 8 to 1 per cent. in 1927, and from 15 to 1 per cent. in 1928.

In connection with " louping ill " the method of infecting ticks is described. Field vaccination against this disease resulted in a decrease in mortality from about 8 to less than 2 per cent. in adult sheep and from 16 to 2·8 per cent. in lambs. A further paper, showing that both " louping ill " and tick-borne fever can be controlled by the abolition of ticks, is promised.

II. The author reports an outbreak of " scrapie " in Border Leicester-Cheviot sheep brought from the Border district to Sussex.—R. S. Roberts.

I. Grabherr, A. (1934). Praktische Erfahrungen über Ferkelkrankheiten und ihre Bekämpfung. [**Control of Piglet Diseases**].—*Wien. tierärztl. Mschr.* **21.** 33-44. 2 figs.

II. Payen, Ballot, & Fournier, P. (1934). Porcelets " trembleurs." [**" Trembles " in Piglets**].—*Rec. Méd. vét.* **110.** 84-86.

I. During seven years' experience in a pig-raising area, Grabherr made complete laboratory examinations of 92 dead young pigs. Their ages varied from four days to eight weeks. The *post-mortem* findings fell into several groups, the chief of which were :– gastro-intestinal catarrh 21 cases, of which 15 harboured *Strongyloides longus* ; gastro-enteritis 7 cases ; liver changes 13, 3 of which were due to *S. longus* ; calcium deficiency 2, 1 with *S. longus* ; anaemia 9, 6 of which were associated with *S. longus* ; various degrees of pneumonia 11 ; trauma 5 ; peritonitis 3 ; paratyphoid 5 ; " piglet pest " [it is difficult to give the English equivalent of this condition] 9 ; various and combined causes, 5. In 5 cases no cause of death could be found.

In 43 of these cases *S. longus* was in evidence. Although this parasite receives scant attention in text-books, in this investigation it was present in approximately half of the cases and was the cause of death in 37 per cent. of them. Contagious diseases such as swine erysipelas, paratyphoid infection and " piglet pest " were not important. Clinically, piglet diseases are often very difficult to differentiate, and especially is this so when parasitic infestation is also present.

In the author's experience there are five important distinct clinical pictures, viz :– (1) more or less sudden death ; (2) cough ; (3) diarrhoea ; (4) skin eruption (Rüss oder Grind) and (5) stunted growth (Kümmern). The bacterial, parasitic, dietetic, hygienic and other causes of each of these five conditions are passed in review and associated with the pathological finding of the investigation. Remedial and prophylactic measures are discussed in detail. For " piglet cough ", swine fever vaccine according to Michalka is recommended. For stunted growth, which is so often due to *S. longus*, hygienic measures with anthelmintic treatment of the sow and young have proved successful. For the sow, areca nut, santonin flowers, " vermitol " and " tativon " were used. For piglets, an extract of garlic in cooked milk was used at first. Later this was combined with " tewega ", a proprietary anthelmintic. The treatment is free from the dangers of overdosing and is well tolerated by piglets under a week old.

II. This is an account by three practitioners of a condition they had observed in one establishment for some time in numerous litters of pigs from birth. Two

or three out of each litter were affected so badly with " trembling " that they could not remain on their legs, and although they took food they did badly and were of no value. They were pure Large Whites or a cross with a boar of that breed and Breton sows. All the measures adopted to correct the condition failed. Three piglets were sent to the pathological department at Alfort. They were two-month-old, castrated males. They remained under the straw and only got up with difficulty and much crying. They were then taken with rapid " trembling " in front and this quickly extended over the whole body. One of the piglets died of pneumonia, but there were no findings on careful *post-mortem* examination which would have explained the trembling. Cod liver oil, calcium gluconate, products of the thyroid and parathyroid glands, uroform and arsenate of strychnine were all tried, but gave rise to no improvement. A second piglet was destroyed and subjected to complete macroscopic, microscopic, biochemical, bacteriological and parasitological examinations, but the results were negative.

Contrasting the condition with an hereditary ataxia described in human medicine, one of the authors suggested changing the boar. This was done and no case of " trembling " occurred in the new progeny. It later transpired that the breeder of the boar experienced a similar disease ten years before, and that it had disappeared when instead of breeding pure breeds, a Middle White boar was used with Large White sows. The third pig was slaughtered some months later ; it had continued to show the same symptoms, and although a complete *post-mortem* examination was made no explanation of the symptoms was forthcoming. —A. W. N. Pillers.

Petersen, W. W. (1934). Den bakterielle verrukøse Endocarditis – en Oversigt, samt et Tilfaelde af Streptokok-Endocarditis hos en Okse. [**Bacterial Verrucose Endocarditis – A Case in a Cow**].—*Skand. VetTidskr.* **24.** 290-296. [36 refs.] [English summary : abst. from orig.]

The author refers to a number of cases of verrucose endocarditis reported by different authors and describes a case in a cow, with lesions on the mitral valve, caused by streptococci.—H. C. Bendixen (Copenhagen).

I. Peters. (1934). Ueber die Sterilität der Stuten. [**Sterility in Mares**].—*Berl. tierärztl. Wschr.* **50.** 474-476.

II. Peters. (1934). Ueber die Sterilität der Stuten. [**Sterility in Mares**].—*Dtsch. tierärztl. Wschr.* **42.** 433.

I & II. Sterility in mares is generally the result of metritis. In the study of the onset of urogenital disorder, it is essential to differentiate between early symptoms of disease and of oestrum. The appearance of the genital tract during oestrum is described. When infection is suspected, it is desirable to swab the uterine mucosa for the purpose of making a bacterial examination. When a mare does not come on heat, although free from apparent genital disease, or where genital disease has been successfully treated, the onset of oestrum may be stimulated by therapeutic measures. Artificial insemination may also be attempted [for various methods see this *Bull.* **4.** 544]. Pregnancy can generally be diagnosed by palpation *per rectum* within six weeks of service.—E. J. Pullinger.

Lilleengen, K. (1934). Hjärtmissbildningar hos djuren. [**Malformation of the Heart in Animals**].—*Skand. VetTidskr.* **24.** 493-555. 10 figs. [102 refs.] [English summary : abst. from orig.]

The author gives a survey of the literature on various types of malformation of the heart in animals (129 cases, apart from acardius and foramen ovale persistens),

and has arranged them systematically in accordance with MØNCKEBERG [(1924). *Henke-Lubarsch Handbuch spez. path. Anat.* Vol. II]. He also describes 37 cases which have come under his own observation. The summary of the 166 cases shows that the greater number of forms which occur in man are also observed in animals. Many of the forms are, however, rare in animals. The frequency of malformations of the heart appears to be greatest in cattle (91 cases), and then in the following order :– horses (28), dogs (17), pigs (8), donkeys (6), cats (5), sheep (4), birds (3), and one case each in an elk, lynx, guinea pig and rat. The congenital malformation of the heart leads frequently to disturbances of the circulation and respiration immediately after birth, followed by early death. In a great number of cases, however, the animal does not display any symptoms, or does so only at a later stage of life. An excellent instance of the adaptability of the heart is recorded in a case of ectopia cordis cervicalis (the case of a cow, 13 years old observed by the author himself).—GUSTAV NAERLAND (FARSUND).

PETERSEN, W. W. (1934). Ovariets Cyster, Cystomer og Dermoidcyster. [**Cysts, Cystomata and Dermoid Cysts of the Ovary**].—*Maanedsskr. Dyrlaeg.* **46.** 129-134. [16 refs.]

The author gives a brief review of his findings on cysts, cystomata and dermoid cysts in the literature (veterinary and medical), in the Museum of Pathology at the Royal Veterinary College, Copenhagen, as well as his own observations as a meat inspector. He gives a short description of the variety of forms and of their appearances, and of the frequency of their occurrence in the different species of domestic animals and poultry.—GUSTAV NAERLAND (FARSUND).

MITCHELL, C. A., WALKER, R. V. L., & HUMPHREYS, F. A. (1933). **Infectious Vaginitis of Cattle.**—*Rep. Vet. Direct. Gen. Canada 1932-33.* pp. 49-50.

Infectious [granular ?] vaginitis was successfully transmitted to cattle by vaginal secretion, but not by diluted and filtered secretion. Blood of affected animals was not pathogenic after transfusion into healthy cattle. Bacteriological work failed to demonstrate any constantly associated micro-organisms. A leptothrix isolated from certain cases was, however, found to be worth further study and experimental work with this organism is in progress.—J. E.

I. DATTA, S. C. A. (1933). **Congenital " Blindness " of Calves in India.**—*Indian J. vet. Sci.* **3.** 254-270. 6 figs. on 3 plates, 7 tables, 1 chart. [20 refs.]

II. TAILHARDAT, B. (1933). Contribution à l'Etude des Ulcérations Cornéennes Secondaires dans les Maladies Infectieuses. [**Corneal Ulceration Secondary to Infectious Diseases**].—*Thesis for Docteur vétérinaire, Lyon.* pp. 93. [90 refs.]

III. BROWN, E. (1934). **Some Notes on Contagious Ophthalmia in Cattle**]. *Vet. Rec.* **14.** 29-33.

I. This is a report on a condition seriously affecting calves in a very localized area of Quetta. It is characterized either by simple amaurosis of obscure origin or by a variable degree of blindness due to the presence of new growths in any part of the eye.

It was suspected that the condition might be hereditary, but, on enquiring into the breeding history of herds investigated, this was considered to be doubtful. The cause would appear to be related to some as yet undiscovered local factor or factors, dietetic or otherwise.

II. This is a general dissertation on corneal ulceration in domesticated

animals secondary to various specific diseases. In certain cases fluorescin is essential as an aid to accurate diagnosis.

III. A description of an outbreak of contagious ophthalmia in cattle in Scotland. It was first noticed in a lot of store cattle one month after purchase from a dealer and during the summer of 1930 spread slowly to four adjacent farms. The disease was characterized by conjunctivitis, intense lachrymation and corneal opacity of one or both eyes. Corneal ulcers sometimes developed, but in most cases the opacity cleared up after a time.

At a later date in 1930 a similar outbreak about 40 miles distant from the first was observed. Other articles on similar diseases are referred to.

—Harvey S. Purchase.

Laval, H., & Carpentier, G. (1934). Léiomyome diffus et jabots de l'iléon, chez le Cheval. [**Leiomyomata and Diverticula of the Ileum in the Horse**]. —*Rec. Méd. vét.* **110.** 517-523. 2 figs. [6 refs.]

This is a clinical record of a case of progressive debility in a horse and a study of the lesions found *post mortem*. The ileum, the chief seat of pathological changes, was found greatly thickened and with its lumen almost completely obliterated. Histological examination led to the conclusion that the condition was one of leiomyoma of the intestinal wall. Reports on cases of a similar nature previously recorded by other workers are summarized.—C. Davenport.

Brunschwik. (1934). Quelques recherches sur le sang dans l'hémoglobinurie paroxystique du Cheval. [**Research on the Blood in Myoglobinuria Paralytica**].—*Rec. Méd. vét.* **110.** 592-595.

The author carried out sedimentation tests with pure blood and with blood treated with citrate or fluoride from 15 horses affected with mycoglobinuria paralytica. The blood was taken at two periods – at an early period of the illness before the crisis (first to seventh hour) and again between the 18th and 24th hours. The results were as follows :– with pure blood taken early, coagulation was rapid and in some cases complete before sedimentation ; clot shrinkage was normal. With pure blood taken later the clot shrank very slowly and not at all in five cases. With blood containing an anticoagulant, using Cesari's index $\left(\frac{\text{height of blood corpuscles}}{\text{total height [corpuscles + plasma + citrates]}} \times 100\right)$ the results indicated a considerable degree of anaemia, which was less severe in similar blood taken later.

In two cases there was haemolysis.—J. E.

Becker, R. B., Neal, W. M., Shealy, A. L., & York, G. (1933). **Stiffs or Sweeny (Phosphorus Deficiency in Cattle).**—*Bull. Fla. agric. Exp. Sta.* No. 264. pp. 27. 12 figs., 6 tables. [21 refs.]

" Stiffs " or " sweeny " is the local equivalent in Florida of the " styfsiekte " of South Africa and the " cripples " of Australia [this *Bull.* **2.** 101, 168 and 391]. The usual osteophagia, loss of condition, reduction of milk yield, poor growth of young stock, skeletal fractures and other clinical evidences of osteomalacia and osteoporosis are recorded. Excellent illustrations of clinical cases, of cases after recovery on bone meal feeding, and of macroscopic bone lesions, are given. Data are tabulated to show that the P content of affected pastures is low, and the inorganic P of the blood is reduced in the grazing stock. Nutritional anaemia [this *Bull.* **3.** 41.] also occurs in Florida range cattle but is not coincident with aphosphorosis.—H. H. Green.

PUBLIC HEALTH.

HANSEN, H. (1934). Om de maelkehygiejniske Krav til Maelk m.m., der er bestemt til direckte Forbrug, med saerligt Henblik paa de praeventive Foranstaltninger til Hindring af Kvaegtuberkulosens Overførelse til Mennesket. [**Selection of Milk for Consumption and the Prevention of the Transmission of Tuberculosis to Man through Milk**].—*Maanedsskr. Dyrlaeg.* **46.** 161-176.

The author gives a general survey of milk control and of the regulations in force for the treatment of milk that is used for direct consumption. These regulations are passed by individual municipalities and are, therefore, not uniform all over the country. From November 1st, 1935, all raw milk and cream sold in Copenhagen must originate from herds in which all the animals have passed the tuberculin test. From November 1st, 1938, this requirement applies to all the milk and cream sold in this city, whether it has been heated or not. Various details in connection with the carrying out of this regulation are discussed.

—H. C. BENDIXEN (COPENHAGEN).

VON NYIREDY, S. (1934). Beitrag zur Kenntnis der Schern-Gorlischen Reaktion. [**The Schern-Gorli Reaction**].—*Z. InfektKr. Haustiere.* **46.** 48-58. [10 refs.]

The author has applied the Schern-Gorli test [this *Bull.* **4.** 125.] to various samples of milk in an attempt to establish the practical value of the test and the factors concerned in the reaction. It was found that, with samples of fresh milk, only bulked supplies could be relied upon to give consistently positive results; with samples of fresh milk from individual animals, 50 per cent. gave negative results. Usually, however, positive results were obtained if the individual samples were allowed to stand in the cold room for 48 to 72 hours before testing. Small increases in acidity, moderate skimming or the addition of water or formalin in small quantities do not interfere with the reaction. Pasteurization at 63°C. is not always followed by a complete disappearance of the ring, although the latter is reduced in size. At 65°C. the ring no longer appears.

The reaction is the result of the absorptive powers of the fat globules and, since heating the milk leads to hydration of the fat-globulin layer, a loss of surface tension is produced and hence the disappearance of the ring.—J. A. NICHOLSON.

I. CHRISTIANSEN, M. (1934). Yverbakterier og Maelkekontrol. [**Udder Bacteria and Milk Control**].—*4. Nord. Vet.-mötet. Helsingfors. 1933.* pp. 155-172. [3 refs.] [German summary: abst. from orig.]

II. SJÖLUND, J. (1934). Juverbakterier och Mjölkkontrol. [**Udder Bacteria and Milk Control**].—*Ibid.* pp. 172-188. 2 tables. [German summary: abst. from orig.]

I. A survey is given of the different bacteria by which milk may be infected. Owing to *Brucella abortus* infection, it is suggested that pasteurization of cream should be compulsory and that raw milk sold as infants' milk should only originate from herds that are free from contagious abortion.

II. At the milk control station of Helsingfors mixed samples of the milk of individual herds are examined twice a month. Trommsdorff's test and microscopic examination are used. In the case of positive findings, the individual cows of a herd are examined, cultures being made of the milk. 1·3 to 5·9 per cent. of the herds examined were found to be infected with *Streptococcus agalactiae* and 16·2 per cent. of the cows of the infected herds excreted streptococci.

—H. C. BENDIXEN (COPENHAGEN).

Langkilde, K. (1933). Principper for den moderne, hygiejniske Kostald. [**Principles for an Up-To-Date, Hygienic Cow-house**].—*Skand. VetTidskr.* **23.** 477-553. 1 fig., 4 tables. [English summary : abst. from orig.]

In the construction of a model cow-house consideration must be given to both the psychological and the physiological requirements of the animals, as well as to their general comfort and the prevention of infection during the 200 days of the year in which Danish cattle are housed.

Comfort chiefly depends on the humidity, temperature and circulation of the air. Of these, humidity is the most important. The heat regulating centres of an animal cannot work efficiently in a damp atmosphere. The optimum temperature for milking cows is 14°C., that for rearing calves and for other cattle is 4·5°C. lower.

The author gives in detail the experimental data, obtained from many countries, on which he bases his theories, together with formulae for the calculation of air space, ventilation and humidity of the shed and the specific heat of the materials used in construction. The ruling prices of building materials in the Scandinavian countries are also given with discussions as to their suitability.

In the model cow-houses described, the site is high and well-drained. The long sides of the buildings face north-east and south-west or north-west and south-east to obtain the maximum of sunshine. The northern end is occupied by food stores and a milk room.

The walls, 3 m. high, are of cavity construction, and are built of stone, brick or cement. They are plastered on the inside for the purpose of insulation, with a material unaffected by soap or soda.

Doorways are 1·3 m. wide and allow only one cow to pass at a time.

The windows are fixed high enough in the walls to prevent breakage and have sloping sills. Their total area averages between a 1/20 and a 1/15 of that of the floor.

If there is a loft a ceiling is constructed on the underside of the floor and ventilating shafts are built like chimneys to terminate in a louvre at the ridge.

Floors are impervious and are made of a variety of materials, the best of which are non-conductors of heat.

Gutters vary in shape, depth and width according to local custom.

Mangers are constructed of cement or asphalt with a separate water bowl for each cow. Ties of the American stanchion type are recommended. The German Grabner chain system works very well, but it is more difficult to unfasten in case of fire or accident.

The cows stand in a double row with their heads towards the centre of the shed. The reasons for this are ; nervous cows can see others and are more content, glare from sun and snow, which is harmful to their eyes is beneficial on their backs ; in case of fire cows are easier to remove from the building, and most important of all, in cases of infectious disease, dung and discharges can be more easily isolated.

Although the model cow-house costs 80 per cent. more to build than those generally in use, the extra expense is more than justified by the saving of labour costs and in the comfort, health and longer productive life of the animals.

—A. A. Forsyth.

Belle, G. (1934). Les fraudes et leur répression dans l'armée. [**Frauds and their Suppression in the Army. Livestock, Meat, Other Foods and Fodder**].—*Rev. vét., Toulouse.* **86.** 522-541.

A paper read at a conference of officers of the Ecole de Perfectionnement du Service vétérinaire. It is a review of the duties of veterinary officers in the French Army as inspectors of food products, particularly meat. The conditions of supply,

and the law in regard to fraud, are considered in detail. The common forms of fraud are dealt with and the methods for detection laid down. These follow accepted lines and contain nothing of an original nature. The author claims that, as far as the army is concerned, the veterinary officer should be the sole authority for the inspection of the food products purchased for troops and animals.

—C. Davenport.

THERAPEUTICS.

I. Wilken-Jorden, T. J. (1934). **Researches into Dips and Dipping. A. Lime-Sulphur Dips. Paper IV. Further Studies on the Colorimetric Method as a Rapid Means of Control of Polysulphide Solutions.**—*Onderstepoort J. vet. Sci.* **2.** 231-237. 6 tables. [4 refs.]

II. Bedford, G. A. H., & Wilken-Jorden, T. J. (1934). **Researches into Dips and Dipping. A. Lime Sulphur Dips. Paper V. The Minimum Effective Concentration of Lime-Sulphur Dips for Sheep Scab Eradication.**—*Ibid.* 239-241. [2 refs.]

I. The effect of free alkali on sodium polysulphide solutions at room temperature was studied since, in the process of dipping, the washing out of the suint of the fleece results in the interaction of dipwash with alkali, and formation of alkali polysulphides. It was found to be slight though the colorimetric method reveals a marked change in chemical nature. Addition of excess sodium carbonate and alcohol causes immediate precipitation of all turbidity-forming materials, so that fairly accurate values can be obtained with both used and unused lime-sulphur dip washes.

II. Experiments were undertaken to determine whether the concentration of 1·5 per cent. of polysulphide sulphur in lime sulphur dips was not unnecessarily high. It was found that from 0·3 to 0·9 per cent. might cure badly infested sheep, but that 0·3 per cent. was not always effective and that higher concentrations should be used.—E. M. Robinson.

van Saceghem, R. (1934). Essais thérapeutiques chez les bovidés infectés par *Trypanosoma congolense*. [**Therapeutic Experiments on Cattle Infected with *Trypanosoma congolense***].—*Ann. Soc. belge Méd. trop.* **14.** 219-221.

This article records experiments on the value of " Dn 7 ", " Dn 18 " and " Dn 20 ", organic antimony compounds, as curatives and protectives in *T. congolense* infection in cattle. " Dn 7 " in doses of 3 g. did not protect against inoculation with infected blood. Though " Dn 7 " and " Dn 18 " showed some trypanocidal value, in that trypanosomes disappeared from the blood stream for a few days after injection, yet relapses occurred in all the animals under experiment, though doses of the drug which produced toxic symptoms were given and large doses were administered repeatedly over long periods.—U. F. Richardson.

I. Popesco, F. (1933). L'action thérapeutique de la fouadine sur la filariose canine. [**The Therapeutic Action of " Fouadine " in Canine Filariasis**].—*C. R. Soc. Biol. Paris.* **114.** 219-220.

II. Frégonneau, W. (1933). Erfahrungen mit der Fuadin-Behandlung bei Schistosomiasis. [**Treatment of Schistosomiasis with " Fouadine "**].—*Arch. Schiffs- u. Tropenhyg.* **37.** 515-528. 1 table. [1 ref.]

I. " Fouadine " was found to be excellent in the treatment of canine filariasis when given intravenously in doses varying from 2 to 5 c.c. Seven or eight injections

suffice, the first four being given at intervals of 24 hours and the subsequent ones at intervals of 48 hours. Towards the end of the course of treatment the dogs begin to show signs of intolerance and ulceration of the scrotum which often appears in male dogs may be regarded as a sure sign that the microfilariae have disappeared from the blood. Fourteen affected dogs were completely cured by this treatment, as judged by the negative results obtained in repeated examination for microfilariae.

II. This is an account of the treatment of 124 human cases of schistosomiasis with " fouadine ", most of which were markedly successful. It is concluded that treatment with " fouadine " is better, safer and cheaper than treatment with tartar emetic.—E. L. Taylor.

Underwood, P. C. (1933). **The Effect of N'Butylidene Chloride on Colts infested with Ascarids.**—*J. Parasit.* **20.** 77-78. [152nd Meet. Proc. Helminth. Soc.]

N-butylidene chloride was given to five colts, four to seven months old, at the dose rate of 0·2 c.c. per kg. body weight. A 36-hour fast was observed before the treatment and a purgative dose of linseed oil was given four hours afterwards. Many ascarids were passed and the colts improved greatly in condition, the average weekly gain of three of them each rising from 2·63 kg. before the treatment to 6·40 kg. afterwards.—E. L. Taylor.

Klarenbeek, A., Veenendaal, H., Voet, M. J., & Ernst, A. M. (1933). Het gebruik van derrispoeder. [**The Use of Derris Powder**].—*Tijdschr. Diergeneesk.* **60.** 1269-1276. [7 refs.] [English, French and German summaries].

Various tests with derris are described. A watery extract (1 : 300) of derris powder with a 2 per cent. rotenone content was found efficacious against external parasites of dogs and cats.

Derris given orally causes sickness, vomition, etc., in dogs and cats, but recovery is fairly rapid. Neither the therapeutic nor the toxic action of derris extract was influenced by boiling for half an hour.—A. Klarenbeek (Utrecht).

Wakamatsu, Y. (1934). Versuche über die Chemotherapie der Hühnererythroblastose. [**Chemotherapeutic Experiments on Erythroblastosis of Fowls**].—*Z. InfektKr. Haustiere.* **46.** 177-186. [5 refs.]

Attempts to treat fowls artificially infected with the virus of erythroblastosis with " hepatrat " and proprietary preparations of gold, silver, arsenic and copper salts, proved valueless. " R237 " (potassium plumbo-di-thio-pyridin-carboxylic acid) and certain other lead preparations had some influence upon the virus, though it was not possible to say whether they had any practical therapeutic value.

—E. J. Pullinger.

I. Meerson, I. S., & Demidowa, L. W. (1933). Ueber ein noch unbekannte Funktion des Retikuloendothelialsystems. XXI. Ueber die dominierende Rolle der Milz beim chemotherapeutischen Effekt. [**An Unknown Function of the Reticulo-Endothelial System. XXI. Dominating Role of the Spleen in Chemotherapy**].—*Z. ImmunForsch.* **81.** 286-292. 3 tables.

II. Cronheim, K. (1934). Retikuloendotheliales System (RES) und Immunkörperbildung. [**Reticulo-Endothelial System and Formation of Immune Bodies**].—*Zlb. Bakt. I.* (*Orig.*). **132.** 204-210. 2 tables. [14 refs.]

I. It has been suggested that the function of the reticulo-endothelial system in chemotherapy is merely to store the drug and release it slowly so that its action continues for a longer period than would otherwise be the case. The authors

injected " germanin " in an attempt to show that the spleen is the main organ in the body to deal in the first instance with the absorbtion of the substance and later with its release at a slow rate into the blood stream. They show that in mice the " germanin " content of various organs is smaller in splenectomized than in non-splenectomized animals. The conclusion is that, in those animals which have not been splenectomized, the increase in content, for example, in the liver, is due to two sources, from direct segregation of " germanin " from the circulation and also from drainage from the spleen into the portal circulation. The results, therefore, indicate that the spleen is probably the main organ in the body in relation to chemotherapeutics.

II. An account of the modern conception of the reticulo-endothelial system is given. Much knowledge has been gained by the experimental removal of the spleen which constitutes the great bulk of the reticulo-endothelial system in the body, and by blockade of the system by the intravenous injection of inert substances.

Evidence that the reticulo-endothelial system aids in the resisting of infection was obtained by the author's experiment, in which he infected three groups of mice with streptococci, one group previously injected with India ink, the second with colloidal copper and the third group being controls. Mortality was lowest in the control group.—J. R. M. Innes.

PHYSIOLOGY.

Ziegler, H. (1934). Anatomie für die Praxis. [**Anatomy and Physiology of the Fore-Stomachs of Cattle**].—*Schweiz. Arch. Tierheilk.* **76.** 449-461. 6 figs. [7 refs.]

An illustrated article stressing the importance of a sound knowledge of anatomy in cattle practice. The six figures are prepared from photographs of special dissections showing the anatomy of the fore-stomachs of the adult bovine, and are very clear and helpful to the understanding of this subject.—J. E.

Egehøj, J. (1934). Undersøgelser over nogle Lymfeknuders Forhold paa Hovedet og Halsen hos Svin. [**Investigations on the Relation between some of the Lymph Glands of the Head and Neck of Pigs**].—*Maanedsskr. Dyrlaeg.* **46.** 282-293. [30 refs.]

The author injected a watery solution of India ink or a mixture of India ink and gelatine into the lymphatic system of the heads and necks of pigs, and so studied the site of the different glands and the communications between them. He says that, in pigs, a " gland " is a conglomeration of several " glands " and states that the name " lymph nodule " is more suitable than " gland ". The average number of glands which form each lymph nodule is also given. His investigations confirm the statements of earlier workers (Gregor, and Postma.) that the superficial dorsal cervical glands form a central point of the lymphatic system of the head and neck of the pig, a statement which is of great importance to comparative anatomy as well as to pathology in meat inspection.

—Gustav Naerland (Farsund).

Lichtenstern, G. (1934). Ueber die Physiologie und Therapie der Leber mit besonderer Berücksichtigung der an der Mayo Foundation, U.S.A. durch Prof. F. C. Mann und Mitarbeiter erzielten Forschungen. [**Physiology and Treatment of the Liver with Reference to the Work of F. C. Mann of the**

Mayo Foundation, U.S.A.].—*Münch. tierärztl. Wschr.* **85.** 425-428 and 437-441. [42 refs.]

This is a concise summary of the more important research work being carried out on liver function and treatment. The greater part of the review is taken up by the well-known work of MANN, of the Mayo Foundation, U.S.A., and his colleagues who have during the past few years made an exhaustive study of liver function in all its varied aspects. The review covers such points as the effect of removal of the liver or of changing the circulation by operation, the structure of the liver, the nature, action and special uses of bile with reference to the functions of the gastric and duodenal glands, sugar metabolism and urea formation and the use of liver substance in therapeutics. Those interested would be well advised to read the original papers.—JAMES STEWART.

LEHNERT, E. (1934). Hästblodgruppernas bestämmande med hjälp av på häst framställda gruppspecifika, högvärdiga sera. [**Blood Group Determination in the Horse**].—*Skand. VetTidskr.* **24.** 401-408. 2 tables. [English summary : abst. from orig.]

This is a preliminary publication. In the introduction the author mentions the disagreement in the results of earlier workers (SCHERMERS and KAEMPFFERS), and points out the difficulty in determining the blood groups in horses because the content of isohaemagglutinins in normal horse serum is very low ; often no traces can be found. By injecting blood from the one group into horses belonging to another group, the author has succeeded in obtaining group-specific sera. These sera are distinguished by their agglutinating power, and, after the addition to them of guinea pig serum, they display very pronounced haemolytic characteristics.

With the help of such high titre immune sera, the author has been able, in about 200 cases examined, to prove the existence of four main groups (a similar system to that for human beings) :– AB (a little over 70 per cent.), Aβ (about 16 per cent.), Bα (about 8 per cent.) O$\alpha\beta$ (about 3 per cent.). [Within these groups there seem to occur modifications of the principal ones]. The author intends to publish at a later date a detailed account of the results that he has obtained, and to deal with some peculiar and interesting phenomena.

—GUSTAV NAERLAND (FARSUND).

HUBER, G. (1934). Ueber das Sauerstoffbindungsvermögen des Blutes. Untersuchungen an gesunden und kranken Pferden und Rindern. Vergleich der spektrophotometrischen Methode mit der Blutgasanalyse. [**Haemoglobin Estimation by Gas Analysis in Healthy and Sick Horses and Cattle**].—*Inaug. Diss. Zurich.* pp. 46. 2 figs., 5 tables. [32 refs.]

The specific gravity, haemoglobin and oxygen capacity were estimated and a leucocyte and erythrocyte count carried out on the blood of healthy and diseased horses and cattle. The Henri spectroscopic method was used for the valuation of the haemoglobin of the washed blood whilst the Sahli standard was used for whole blood. Examinations were made of the blood of 16 normal horses and 11 normal cattle and the author compares his results with those of MÜLLER [this *Bull.* **4.** 391]. The specific gravity ranged from 1,048 to 1,068, the leucocyte count averaged 8,470, the erythrocyte count 8,548,000 and the haemoglobin 67 in the case of the blood of normal horses ; and the specific gravity ranged from 1,030 to 1,061, the leucocyte count averaged 7,736, the erythrocyte count, 7,739,500 and the haemoglobin 56 in the blood of normal cattle. The oxygen capacity was estimated by both the Barcroft and Van Slyke methods and a valuable feature of

the paper is the discussion on the results obtained. Several cases of anaemia, bronchitis and pneumonia in the horse and tuberculosis of the lung, anaemia, tumours of the throat and nose, actinomycosis, pyometra and nephritis in cattle were examined, but the number of cases of any one disease is too small to warrant any definite conclusions.—James Stewart.

Reisinger, L. (1934). Die Schilddrüse, eine Uebersicht über bisherige Forschungsresultate. [**The Thyroid : A Review of Knowledge**].—*Tierärztl. Rdsch.* **40.** 253-256. [15 refs.]

The author has given a short account of the development, structure and function of the thyroid gland and of the chemical substances which it elaborates. It is pointed out that a decrease of thyroid activity insufficient to produce the classical changes associated with thyroid dysfunction is shown by a slowing down of metabolic changes, and that small doses of thyroid administered to healthy animals produce an increase in the rate of metabolism of the organism. Careful observation has shown that these effects are very similar to the changes produced on stimulation or depression of the sympathetic nervous system. For example, oversaturating the body with thyroid produces tachycardia, oedema of the connective tissues and pathological changes in the thymus, thyroid and adrenal glands. Recent experiments have shown, however, that the organism is capable of preventing the accumulation of the products of thyroid secretion. It appears that extirpation of the thyroid and administration of its active principles will furnish little further information concerning activities of the gland, and that further research should be directed to the connection between the thyroid and vitamins, and the behaviour of the gland in many diseased conditions.—George D. Shearer.

Miller, E. W., Graves, R. R., & Creech, G. T. (1934). **Results of Transplanting Gonadial Tissue in Dairy Cows and Bulls.**—*J. agric. Res.* **49.** 259-278. 12 figs., 2 tables. [4 refs.]

Ovarian tissue was removed from cows and pigs shortly after slaughter and transplanted into the muscles of a series of cows. No appreciable effect on the ovarian cycle or on the production of ova was observed in normal cows, nor were animals suffering from metritis or ovarian cysts in any way benefited. Some months later, *post-mortem* histological examinations showed that the transplanted ovarian tissue rapidly underwent degeneration in the host and became surrounded by connective tissue, whilst in some cases connective tissue only was found at the site of operation.

Testicular tissue obtained from a young live bull was transplanted into a series of senile bulls. The transplant did not have any effect upon the spermatozoa of the senile bulls, although it was thought that their sexual appetite had been increased. Testicular tissue from young pigs likewise produced little or no effect when transplanted into bulls. As in the case of the cows, the transplanted tissue rapidly underwent degeneration in the host, connective tissue invading the transplant.

There is nothing to indicate that any irregularities other than senility or infantilism have been corrected by grafting gonadial tissue into cattle.

—J. A. Nicholson.

Karmann, P. (1934). Erfahrungen mit dem Mäuseversuch bei der Feststellung der Trächtigkeit der Stute. [**The Mouse Test for the Diagnosis of Pregnancy in Mares**].—*Dtsch. tierärztl. Wschr.* **42.** 437-439. [8 refs.]

The blood serum or urine to be examined is injected subcutaneously into

four-week-old female mice and the animals are killed a week later. Several injections are usually made into the same mouse, but by decreasing this number and by examining the ovaries as well as vaginal smears, the technique is simpler and the results more accurate. Extensive experiments have shown that, although the method is not 100 per cent. correct, the results are sufficiently reliable to make it a valuable means of diagnosing pregnancy in the mare.—J. A. Nicholson.

I. Butenandt, A. (1934). Neuere Ergebnisse auf dem Gebiet der Sexualhormone. [**The Sexual Hormones**].—*Wien. klin. Wschr.* **47.** 897-901 and 934-936.

II. —. (1934). **The Sex Hormones.**—*Lancet.* **227.** 312-313. [3 refs.]

I. The present state of knowledge shows that the internal secretion of the anterior pituitary is of great importance, for without this secretion the reproductive glands of both sexes will not function properly. It has been suggested that the anterior pituitary secretes two hormones, prolan A and B, but these have not been isolated separately and recent experiments indicate that the question may be one of the amount of prolan circulating in the blood stream. The physiologically active substances obtained from the urine of pregnancy are probably of placental origin. A crystalline substance $C_{20}H_{28}O_2$ has been isolated from the corpus luteum, 0·75 mg. of which produces proliferation of the uterine mucosa of immature rabbits. This substance is considered to be the active principle of the corpus luteum.

II. The sexual hormones so far isolated in a pure state have all shown themselves to be a closely related group of compounds containing the cyclopentenophenanthrene ring system. It has also become clear that the main function of the anterior hypophysis is to stimulate the gonads. These in turn react on the hypophysis by means of nervous impulses which inhibit its activity in the final phase of the sexual cycle.—J. A. Nicholson.

Curson, H. H., & Quinlan, J. B. (1934). **Studies in Sex Physiology. No. 10. The Situation of the Developing Foetus in the Merino Sheep.**—*Onderstepoort J. vet. Sci.* **2.** 657-663. 41 figs., 1 table. [6 refs.]

The authors were able to make use of a large amount of material from Merino ewes which had been used for fertility experiments by Quinlan and co-workers. They concluded that, not only in the ewe but also in the mare and cow, the situation of the developing foetus is not known with any certainty. Examination of the gravid uteri of the dead sheep indicated that longitudinal presentation apparently remained the same throughout a particular pregnancy whereas position and posture, apart from orientation, were likely to be changed, the former especially in early pregnancy and the latter in late pregnancy. Of 36 single pregnancies, the foetuses were placed in the right uterine horn in 21 cases and in the left in 15.

—E. M. Robinson.

Cowell, S. J. (1934). **Recent Contributions to the Study of Vitamins.**—*Bull. Hyg., Lond.* **9.** 567-578. [91 refs.]

The author has wisely been content to show the trend rather than attempt a critical review of the whole field of recent vitamin research. The more important developments which he mentions are as follows : – much work has been done on the chemical nature and constitution of the vitamins ; vitamin A has been shown to be allied to carotene ; vitamin B_1 to be concerned with the oxidative processes related to carbohydrate metabolism ; vitamin B_2 to owe its biological effect to two separate substances, one of which is a flavine and the other

as yet unidentified ; vitamin C to be chemically identical to ascorbic acid ; and vitamin D to be easily isolated in a pure state.

The relationship of vitamin A deficiency to the production of nervous lesions and to the lowering of the resistance of animals to spontaneous infection has been the subject of much discussion and much of the earlier work has been challenged. Moore and others have reported the symptoms of hypervitaminosis A, chief of which seem to be softening of the bones. It has been confirmed that human beriberi can be successfully prevented and treated by vitamin B_1 and many authors assert that pellagra is due to a simple deficiency of vitamin B_2, but this is still contested by others. Ascorbic acid (vitamin C) is an efficient antiscorbutic in human beings and recent work on guinea pigs suggests that latent scurvy may be a predisposing factor in the development of rheumatic fever. There is still considerable difference of opinion regarding the mode of action of vitamin D, but much work has been carried out to show the antirachitic value of vitamin D and its use as a prophylactic in rickets. The work of M. Mellanby and others on the relationship of vitamin D to dental caries has assumed a great importance.—James Stewart.

Rossouw, S. D., & Wilken-Jorden, T. J. (1934). **Studies of the Origin of the Sulphur in Wool. I. A Study of the Sullivan Technique for Cystine.**—*Onderstepoort J. vet. Sci.* **2.** 361-368. 3 figs., 1 table. [11 refs.]

As a result of their investigation, the authors have shown that a considerable improvement in Sullivan's method as a quantitative colorimetric one for the determination of cystine can be made by better regulation of the conditions necessary for optimum maximum colour development. This involves increasing the cyanide concentration and regulating the time interval between the adding of the napthoquinone reagent and the alkaline sulphite. Various substances interfere with the intensity of the final colour obtained. Amino-acids, ammonium salts and sodium borate retard or inhibit the reaction. Sodium and potassium chlorides and sulphates have been found to exercise an accelerating and intensifying action.

—E. M. Robinson.

Cunningham, I. J. (1934). **Sugar Cane Molasses. A Source of Assimilable Calcium and Magnesium for Animals.**—*N. Z. J. Sci. Tech.* **16.** 81-87. 4 tables. [3 refs.]

Analysis of cane sugar molasses has shown that it contains high proportions of calcium and magnesium, all of which are soluble in water. When administered to sheep *per os* the blood Ca and Mg was raised 50 per cent. in one hour and the rise persisted for at least five hours, but less than 24 hours.

The effect of administering Mg as a sulphate and as an oxide *per os* was also discussed, it being found that magnesium carbonate and molasses raised the Mg of the blood to a greater extent than did either $MgCO_3$ or molasses alone.

Molasses is recommended as a subsidiary material for the treatment of milk fever and grass tetany.—C. S. M. Hopkirk.

POISONS AND POISONING.

Thorburn, J. A. (1934). **Chase Valley Disease.** *Cestrum Laevigatum* **Schlect, its Toxic Effects on Ruminants.**—*Onderstepoort J. vet. Sci.* 2. 667-679. 2 figs.

In this paper the symptoms and lesions of an acute plant poisoning occurring near Pietermaritzburg, Natal, are described. The cause was found to be the green

leaves and berries of the inkberry plant, *Cestrum Laevigatum* Schlecht. The plant was found to be in the toxic stage in the months of June and July. Only cattle are affected under natural conditions and the poisoning is usually very acute in type. Symptoms of acute abdominal pain are noticed and the animal may become aggressive. Inco-ordination of movements and staggering gait are seen and all the general symptoms of an acute poisoning. *Post mortem*, epicardial, endocardial and myocardial haemorrhages are observed. Marked congestion of the liver and spleen are usually noticed and the caecum is usually filled with blood. Treatment is symptomatic.—E. M. Robinson.

Bennett, R. (1934). **Subacute Arsenical Poisoning in Horses.**—*Vet. Rec.* **14.** 1149.

A report of arsenical poisoning in three horses which had been turned out on a marsh near a factory. The horses were greatly tucked up, were very thirsty and showed a slight rise in temperature, a weak and irregular pulse and bright red mucous membranes. Arsenic was found in hair taken from the horses and in grass and earth from the pasture. Recovery after a suitable change was complete in three weeks.—J. E.

Heller, V. G. (1933). **The Effect of Saline and Alkaline Waters on Domestic Animals.**—*Oklahoma Agric. & Mech. Coll. Agric. Expt. Sta. Bull.* No. 217. pp. 23. 5 figs., 10 tables. [15 refs.]

Samples of water from Oklahoma and the surrounding states are known to be heavily saturated with sodium, calcium and magnesium chlorides and sulphates. Experiments were conducted with prepared solutions to determine the injurious effect on rats, chickens, pigs, sheep and cattle. It was found that animals would not drink these waters if good fresh water was available.

The risk of injury from saline or alkaline water was found to depend upon the concentration of total salts and not upon any individual salt.

As a rule it was found that the maximum limit without loss of health was 1·5 per cent. of total salts. This figure was found to be lower for lactating animals.

The degree of tolerance varies with the species, age and sex of the animals and whether they are pregnant or lactating. The numerous experimental results are given in tabular form.—Geo. F. Boddie.

TECHNIQUE.

Lasseur, P., & Benoit, M. (1934). Observations sur la méthode de Gram. [**Observations on Gram's Stain**].—*Trav. Lab. Microbiol. Nancy.* No. 7. 129-151. 10 figs., 4 plates, 3 tables. [6 refs.]

The details are given of research work conducted by the authors with a view to obtaining information as to how far the following factors influence Gram's staining method :– the role of the stain, action of pH, age of the organisms and the part played by the bacterial membrane. Working with cultures of *Bacillus mesentericus* and *B. subtilis* the authors found that, contrary to a prevailing impression concerning most young organisms, germinating forms of these organisms were always Gram-positive. Furthermore, all abnormal forms of these organisms stained by Gram, but the intensity of the colour varied with the density of the cytoplasm. The bacterial membrane which plays a significant part in the staining of living cells does not influence the staining of dried and fixed organisms.

Those interested in this subject and also in its historical aspect should consult the original.—Gwilym O. Davies.

Howie, J. W., & Kirkpatrick, J. (1934). **Observations on Bacterial Capsules as Demonstrated by a Simple Method.**—*J. Path. Bact.* **39.** 165-169. 6 figs. on 1 plate. [4 refs.]

Take four parts 10 per cent. water-soluble eosin (" yellowish " or " bluish ") or erythrosin in distilled water, one part of serum (human, rabbit, sheep or ox, heated at 56°C.) and a crystal of thymol. Allow the mixture to stand at room temperature for several days, centrifuge and store the supernatant fluid. Place a loopful of the test fluid on a slide, add a loopful of Ziehl-Neelsen's carbon fuchsin diluted 1 : 5, and allow to stain for half a minute. Add a loopful of the eosin solution and leave for one minute. Spread as for a blood film. Dry and examine. The capsules show up as unstained areas in the eosin-stained background. The bacterial bodies are stained red by the fuchsin.—A. Brownlee.

Zaribnicky, F. (1934). Ueber eine einfache, lichtechte Färbung des Zellbildes der Milch. [**A Simple Staining Method for Milk Cells**].—*Berl. tierärztl. Wschr.* **50.** 224. [4 refs.]

In order to prevent the fading which tends to follow the use of the ordinary stains for smears of milk cells the author recommends the following method :- Solution I. Naphthazarin 0·25 g. and chemically pure aluminium chloride 5·0 g. are dissolved by boiling in 100 c.c. of distilled water and the solution is filtered. Solution II. Azophloxin 0·3 g. is dissolved in 100 c.c. of distilled water. Before use two parts of solution I are mixed with one part of solution II and the smear is either stained for five to seven minutes when cold, or the slide is heated over a flame until steam is observed. In place of Canada balsam, a synthetic neutral preparation " caedex " is used to seal the cover slip.

Smears so stained (red) retain their colour after exposure to direct sunlight. —J. E.

Miller, F. W., & Evans, E. I. (1934). **Technic for obtaining Spermatozoa for Physiological Dairy Studies and Artificial Insemination.**—*J. agric. Res.* **48.** 941-947. 6 figs. [3 refs.]

The collection of semen from the vagina immediately after service is unsatisfactory for the physiological study of the spermatozoa because the semen is mixed with the secretions of the cow. To overcome this drawback the authors obtained semen direct from bulls. This is accomplished by inserting the hand 7 to 10 inches up the rectum and massaging the accessory genital organs. These then liberate a fluid which may be collected as it drops from the penis. By careful manipulation it is possible to obtain separately the fluid contents of the seminal vesicles and the ampullae of the ductus deferens. The seminal vesicles yield a turbid fluid containing epithelial cells, whereas the fluid obtained from the ampullae contains only spermatozoa. Where the semen is required for artificial insemination it is better to collect the fluid from the seminal vesicles and the ampullae together.

—J. A. Nicholson.

Quigley, J. J. (1934). **A Simple Technic for Ultrafiltration.**—*Amer. J. Hyg.* **20.** 218-224. 2 figs., 1 table. [8 refs.]

This article describes a method of preparing nitrocellulose discs with large filtering surfaces. Alundum candles are saturated with an acetic acid nitrocellulose solution of known composition (5 to 10 per cent.) using a vacuum impregnation method which coats the thimbles with a uniform layer of collodion. The thimbles are then mounted in metal holders from Mandler candles and are sterilized by a 1 : 10,000 solution of merthiolate.

A 5 per cent. membrane was capable of filtering 600 c.c. to 700 c.c. of water at 23°C. under a pressure of 60 to 80 mm. of mercury in 60 minutes.

—R. E. Glover.

Hambourger, E., & Durand, R. (1934). Sur un procédé pratique de contrôle des ampoules à vide. [**Practical Technique for Testing Ampoules for Vacuity**].—*Arch. Inst. Pasteur Tunis.* **23.** 384-388. 1 fig.

This is an illustrated description of a simple and practical method for controlling the presence of a vacuum in an ampoule based on Tesla's classical apparatus. With this apparatus a difference of potential of many thousand volts can be obtained which sets up an intense electrical field capable of illuminating a tube of rarified gas placed in the field. By placing an ampoule within this electrical field, the presence of a satisfactory vacuum can be determined. From experiments which the authors carried out, it was shown that the test appeared to have little or no action on the virus contained in the ampoule.—Gwilym O. Davies.

MISCELLANEOUS.

Tanganyika Territory. (1934). **A Memorandum on the Economics of the Cattle Industry in Tanganyika.** pp. 25. Dar Es Salaam : Govt. Printer. [4to].

This publication deals in a very clear manner with the economic problems facing the cattle industry in Tanganyika. The different steps which need to be taken to make cattle raising more profitable for the owner and beneficial to the country as a whole are clearly described.

Trypanosomiasis renders two-thirds of the territory unfit for cattle whilst East Coast fever and the lack of surface water only allow of light stocking in many parts. Some of the areas are, however, overstocked with cattle and small stock. This means that during the dry season many cattle have either to die of starvation or go out into " fly " country to find grazing. It is estimated that 200,000 head die annually directly or indirectly from starvation.

There are 150,000 head which could annually be marketed with benefit to the pastures and breeding stock of the territory. For the handling of such large numbers the market conditions would have to be improved. Suggestions for market improvements and well reasoned projects by which cattle could be concentrated at convenient centres are given.

The fact that neighbouring British territories are faced with similar problems leads to the obvious conclusion that the solutions of these problems could best be arrived at by co-operation and combined action. Only by such co-operation could large reliable firms be induced to purchase and utilize the large numbers of cattle available.

Tanganyika has a great future for native cattle, as the natives love and understand their cattle whilst the cost of raising them is negligible. At present the native lacks organizing ability and his attitude towards his cattle is one in which he finds difficulty in understanding that the quality is as important, if not more so, than the number of cattle an owner possesses.—Harvey S. Purchase.

Darling, F. F. (1934). **Animal Husbandry in the British Empire.**—*J. R. Soc. Arts.* **82.** 817-837.

Introduction.—British breeders of beef cattle aim at a type which matures early, is not too heavy, with weight distributed in those parts of the body which gives the most palatable meat and highest prices, e.g., loins, rumps and the buttock,

the forequarters being light. In many parts of the colonial empire the value of cattle is estimated on a different basis, powerful forequarters being necessary for draught purposes ; a combination of the draught ox and beef type may, however, supply an animal suitable to stand tropical climates.

In sheep, if wool is required, then fine wooled, heavy fleeced types of animals are bred. If quick maturing lamb is wanted, another type is used, or the two may be combined by using the Romney-Southdown-Cross.

Great Britain and the Dominions.—Great Britain is still the stud farm of the world, although not to the same extent as formerly. The equable climate and vegetation, also freedom from many protozoal and bacterial diseases transmitted by insects and ticks has assisted in the attainment of the high pitch of excellence of our animals. We have unfortunately to contend with sterility and this trouble is to be found in the Empire as a whole. Britain provides many breeds of cattle and sheep. The exported Shorthorn has graded up the native cattle of Argentina ; the Aberdeen Angus has provided a type which matures early, seen in the corn-belt of the United States of America, while the Hereford is still supreme on the western ranges of North America. It is interesting to note that only 5 per cent. of this country's cattle are pedigreed; Ireland and, recently, Scotland have led the way in the use of pedigree cattle breeding, by the elimination of the " scrub " bull and by the bull inspection scheme. The English Licensing of Bulls Act came into force in August of this year ; the results will be interesting to watch. The Pig Marketing Board should have a unifying influence on breeding the right type of bacon pig. Environment has much to do with breeds, e.g., on poor land on hills, Blackfaces only survive ; the limestone hills of Sutherland and Caithness give us Cheviot and Border Leicesters. The Romney Marsh sheep appear to withstand the parasites of marshland.

In Canada the agricultural colleges take the place of the stud farms of Britain, and the farmers look to these studs and their administrators for guidance. In Canada sheep breeding is increasing, and in so cold a climate a thick birth coat on lambs is necessary ; this genetical problem is being tackled.

Australia is the greatest wool producing country in the world, but good fat lambs are also being produced. Sterility in ewes is a problem ; fertility may be as low as 55 per cent. Cattle in that country have decreased in number, but may now increase with development of beef exported in the chilled condition ; zebu cattle are being used for crossing, for the production of animals capable of withstanding ticks and droughts. A " milking " Shorthorn type has also been produced, one of which holds the world's record of 1,614 lb. of butter fat in 365 days ; this cow weighed 19 cwt.

The average butter fat yield of New Zealand cows has increased 10 per cent. within the last six or seven years, the Jersey being the most popular breed.

In South Africa, British and European breeds have been acclimatized successfully, there being some high quality Friesland and Ayrshires. The Afrikander appears to retain qualities of disease resistance, and is a good " forager ", but is a slow maturer for fattening purposes ; crossing with Shorthorn, Angus, Hereford, North Devon and Sussex bulls is being done to produce good quality beef. Trek oxen are still a necessity. Some of the finest of the world's wool is produced in South Africa. The extreme fineness of this wool is perhaps due to deficiency of phosphorus in the soil.

India.—There is little record of restriction of breeding. Nevertheless careful breeding has produced types, e.g., the Kankrej, Kangyam and Ongole breeds. The Mysore in the south and the white breeds in the north, e.g., Bhagnari, Hariana and Malvi. Obstacles to improvement in breeding are religious prejudice and

objection to sterilization of undesirable bulls. The buffalo is the milking animal of the country. Military and dairy farms supply milk to the troops and, in doing so, opportunity is taken to improve breeds by using Friesian and Ayrshire bulls on native cows.

East Africa, (Kenya, Tanganyika, Uganda, Sudan), West Africa (Nigeria, Gold Coast, Sierra Leone) and West Indies (British Guiana and West Indian Islands).—In East Africa there are the small European-owned cattle stocks and the native ranch cattle of the reserves. It is very difficult to make improvements as cattle are currency ; therefore, numbers count more than quality. In Uganda there have been improvements, but unless the activities of the veterinary staff are maintained, the native goes back to his old ways. In Tanganyika improvement in grading is carried out by the use of Ayrshire, Friesian, Afrikander, Krishna Valley (India) zebu, Devon and Angus bulls ; Kenya is producing Merino sheep crosses. The Sudan produces high class saddle horses by the use of Arab and thorough-bred stallions. Good camels are also produced.

In the northern provinces of Nigeria and the Gold Coast, the Fulani cattle-tending tribe have evolved two definite strains of cattle, one being a milking strain which calves at two-yearly intervals, and has a long lactation period. In the Gold Coast, we find the native humpless " West African Shorthorn " and the humped zebu. The former has a greater resistance to trypanosomiasis than the zebu type which in turn has a higher resistance than the imported European type. Crosses between the two types are good. The Northern Territories of Nigeria and the Gold Coast have great potentialities for providing beef cattle.

Jamaica has a considerable herd of dairy cattle of European breeds.

In Trinidad the Friesian is crossed on native cows and back-crossed to Friesian bulls, producing a good type of animal withstanding tropical diseases. British Guiana is importing zebu bulls from India to assist in grading up native stock.

Obstacles, such as disease and nutritional deficiency of pastures, are being combated in a magnificent spirit by the veterinary and agricultural services.

—T. Dunlop Young.

New Zealand. (1934). **An Act to make Better Provision for controlling the Sale of Stock Remedies.**—*Stock Remedies Act No.* 5. pp. 12. Wellington : Govt. Printer. [8vo].

The Stock Remedies Act, New Zealand, which comes into force on June 1st, 1935, arranges for the establishment of a Registration Board composed of the Registrar, who will be a veterinarian of the Department of Agriculture, of a representative of the New Zealand Veterinary Association, and of a representative of the Pharmacy Board.

The Board has power to appoint analysts and inspectors. All stock remedies must be registered and the literature concerning their sale passed by the Board.

A Stock Remedy, for the purposes of the Act, means :—" Any substance (including vaccines, sera, and other biological products) manufactured, advertised, or sold as a remedy for general use for the cure or prevention of disease in stock, or for the destruction or prevention of parasites in stock, or for the maintenance or improvement of the health or condition of stock, but does not include any substance which is used primarily as a food for stock."—C. S. M. Hopkirk.

von Ostertag, R. (1934). Die Bedeutung der Errichtung veterinärbakteriologischer Institute an den tierärztlichen Hochschulen und Veterinärfakultäten und ausserhalb derselben. **[Importance of the Establishment of**

Veterinary Bacteriological Institutes at Veterinary Colleges and Faculties and elsewhere].—*Acta path. microbiol. scand.* Suppl. 18. 205-224. [Orig. in German].

In this dissertation, included in a publication to celebrate the 70th birthday of C. O. JENSEN, von Ostertag traces the influence on the progress of veterinary science of the establishment of bacteriological research institutes, beginning with the State Serum Laboratory at Copenhagen set up in 1909. Incidentally he recalls the part that he himself played in Germany from 1892 when he went from Stuttgart to Berlin, and the struggles he had to get such institutes founded. At the present day there are research institutes in every state of the Reich, both in connection with veterinary high schools and faculties, and with chambers of agriculture, abattoirs, etc. The article includes a summary of the most important bacteriological discoveries, beginning with that of the anthrax bacillus by KOCH in 1876, and gives a full account of JENSEN'S research work and discoveries.

The three most important pieces of work to be undertaken, if not already begun, are (1) the control of tuberculosis in cattle ; (2) bacteriological examination of meat, in the case of all animals slaughtered by order, as a protection against food poisoning, and the bacteriological examination of suspected milk, and (3) assistance in the daily work of veterinary officers and private practitioners who are becoming more and more dependent upon laboratory diagnosis.—F. BULLOCK.

OFFICIAL AND OTHER REPORTS.

CANADA. (1933). **Report of the Veterinary Director General for the Year ending March 31, 1933.** [HILTON, G.] pp. 54. 29 tables. Ottawa : J. O. Patenaude. [4to].

One of the most important functions of the department was the prevention of the introduction of diseases from abroad, notably of foot and mouth disease from Europe and the United States, where outbreaks had occurred during the year.

Canada was comparatively free from many of the dangerous infectious diseases of animals and has begun to make progress in the eradication of bovine tuberculosis and bovine contagious abortion. Material progress has been made in the control of bovine tuberculosis. Commencing in the face of opposition nearly 40 years ago there has been a gradual increase in the demand for its control due to sound educational propaganda. The encouragement of this demand through the adoption of more aggressive and liberal policies has resulted in the department obtaining the co-operation of public health bodies, dairymen and livestock owners.

The demand for this work has increased to such an extent that in recent years this problem has been the controlling factor in regard to the personnel and expenditure of the field division of this branch.

The peculiarities of bovine contagious abortion and its wide prevalence necessitate the exercise of caution in the adoption of regulatory measures, as they must be reasonable, practicable and consistent with the progress in the control of the disease. While the herds receiving attention are not numerous, they are steadily increasing, and there are indications that the demand for the test may reach large proportions when livestock owners more generally appreciate the advantages of a herd free from infection.

Bovine haematuria received special attention and an experimental farm was acquired in an area in British Columbia, where the disease is present, so that research work can be carried out from various angles including botanical and chemical work. Equine infectious anaemia [swamp fever] is under investigation :

a difficulty in the progress of such work is that small laboratory animals cannot be infected. It is being investigated at the Animal Disease Research Institute at Hull, Quebec, and at the branch laboratory at Lethbridge, Alberta.

A virus disease of foxes kept in captivity was also investigated : it is evidently very closely related to dog distemper. A distemper-like disease occurs in sledge dogs and was investigated in the field with the assistance of the Royal Canadian Mounted Police.

The main points of an agreement arrived at between the delegations of Canada and Great Britain at the Imperial Economic Conference with regard to traffic in livestock are given : they refer to a shortening of the quarantine period for animals imported into Canada and the curtailment of restrictions for Canadian cattle destined for Great Britain.

The reports of the Contagious Diseases Division, of the Meat and Canned Foods Division and of the Pathological Division, which are included in that of the Veterinary Director General, are dealt with separately in this *Bull.*—J. E.

CANADA. (1933). **Report of the Pathological Division, Health of Animals Branch, for the Year ended March 31, 1933.** [WATSON, E. A.].—*Rep. Vet. Direct. Gen. Canada. 1932-33.* pp. 40-54.

This division is concerned with diagnosis, the preparation of biological materials and with research. Owing to the need for economy, the latter has been curtailed and the publication of a full report of the research work performed has been held up, so that in this report only short abstracts of the work on individual problems are given [these are being abstracted further for publication in this *Bulletin* under their appropriate sectional headings].

In addition to the principal research institute at Hull, Quebec, there are three other institutes, of which separate reports are given by the respective officers in charge, as under :—

VETERINARY RESEARCH STATION, LETHBRIDGE, ALBERTA. [HEATH, L. M.]

Attempts to immunize virgin heifers against *Br. abortus* infection were in progress. The immunological characters of anti-*abortus* equine serum were studied and the intradermal test for the diagnosis of the same infection in cattle was tried out and found to be inferior to serological tests.

Studies were also made on range paralysis of fowls (blood picture and serological diagnosis), on fractionation of tuberculin prepared on synthetic media and on mineral metabolism of domestic animals.

PATHOLOGICAL LABORATORY, SAANICHTON, BRITISH COLUMBIA. [BRUCE, E. A.]

This laboratory was transferred from Agassiz, in order to facilitate research into haematuria of cattle, and a farm for field research on this disease was taken over and stocked with 20 head of cattle.

POULTRY DISEASES LABORATORY, CENTRAL EXPERIMENT FARM, OTTAWA. [WEAVER, C. H.]

This was nearly exclusively concerned with routine diagnosis, but such spare time as was available was devoted to the study of certain phases of fowl pox, laryngotracheitis, intestinal parasitism, cannibalism and avitaminosis.—J. E.

CANADA. (1933). **Report of the Contagious Diseases Division, Health of Animals Branch, for the Year ending March 31st, 1933.** [CAMERON, A. E.]—*Rep. Vet. Direct. Gen. Canada. 1932-33.* pp. 12-18.

Anthrax is rare in Canada, only two outbreaks being notified during the year. One case of glanders was detected ; the horse was destroyed and steps were taken

to prevent the spread of contagion. Five outbreaks of swine fever occurred, but were quickly controlled by slaughter and serum treatment of in-contacts.

Both sarcoptic and psoroptic mange were observed in cattle in Manitoba, Saskatchewan and Alberta: these outbreaks necessitated the quarantine and treatment of 4,877 cattle. Twenty-five cases of mange in horses were confirmed and the disease was also treated with the aid of quarantine.

Rabies was confirmed in seven dogs, two cattle and three sheep; no further trouble occurred.

Tuberculosis eradication is well organized. Different methods of campaign are in force simultaneously for particular purposes. There is an Accredited Herd Plan, a Supervised Herd Plan, a Municipal Tuberculosis Order, and a "Restricted Area" System. Accredited herds numbered nearly 6,000 at the end of the year. Twenty-four municipalities were included in the Municipal Tuberculosis Order, by which herds supplying milk for consumption are tested free with tuberculin, reactors being slaughtered and compensation paid. In the "Restricted Area" scheme for the building up of clean herds, some 436,000 cattle are included.

292 herds were under supervision for the control of bovine contagious abortion.

The feeding of swine upon garbage or swill, either raw or cooked, obtained elsewhere than on the premises where fed, is prohibited unless special permission in writing is first obtained from the Veterinary Director General.

The enforcement of this regulation is believed to have a direct effect in preventing outbreaks of hog cholera [swine fever] as all garbage fed under licence is required to be thoroughly cooked and the premises must be maintained in a sanitary condition.

Stock car inspectors are maintained at 30 railway centres throughout the Dominion at which all stock cars, arriving at or passing through these points, are cleansed and disinfected under supervision unless they show evidence of having been so treated. Cards are affixed to these cars showing the date of inspection and the name of the inspector who supervised the work. Railway cars which have conveyed restricted products such as hides and wool are also cleansed and disinfected in a similar manner before being released. All stock-yards are cleansed and disinfected and maintained in a sanitary condition. In disinfecting stock cars and yards, limewash with an approved disinfectant in proper strength is used.—J. E.

New Zealand. (1934). **Annual Report of the Department of Agriculture for the Year ending March 31st, 1934.** [Reakes, C. J.] pp. 58. 12 tables. Wellington: Govt. Printer. [fcp] [1s. 3d.]

Of the work of the different sections of the Department, that of the Live Stock Division, Veterinary Laboratory and Chemical Section are dealt with separately in this *Bull.* [below].

The number of dairy cows was 1,927,000 and of sheep 28,550,770.

Mention is made of the trial shipments of chilled beef which were landed in good order in England.

The pig industry is expanding.—C. S. M. Hopkirk.

New Zealand. (1934). **Report of the Live Stock Division.** [Barry, W. C.]—*Rep. Dep. Agric. N.Z. 1933-1934.* pp. 13-20. 4 tables.

This report deals with Diseases of Live Stock, Dairy Inspection, Live Stock Statistics, Quarantine, Rabbits and Noxious Weeds and Meat Inspection.

Diseases of Cattle.

Tuberculosis.—6·17 per cent. of cattle killed in abattoirs were found affected in varying degrees.

Actinomycosis and Actinobacillosis are fairly common : 636 animals were condemned and compensation was paid. Actinobacillosis, which is often curable, is diagnosed by a blood agglutination test.

Blackleg was prevalent in Auckland and 32,000 calves were vaccinated with a formalinized vaccine.

Johne's Disease is causing some anxiety. " Johnin " tests are being made in a number of herds and the disease has been proclaimed under the Stock Act.

Anthrax.—One case only was diagnosed during the year.

Mastitis is common. A control scheme is in operation [this *Bull.* **4.** 449].

Bovine Contagious Abortion is present, as in other countries.

Cattle Ticks.—Regulations for control are under discussion. Ticks are wide-spread, but are not vectors of any serious disease.

Sterility.—Special attention has been paid to this problem and the three main causes – mineral deficiency, cervicitis of cows and infertility in bulls – are being dealt with.

Notes on foot-rot, grass tetany, milk fever and parasites of calves are also given.

Diseases of Sheep.

Caseous Lymphadenitis.—Carcasses intended for export are very carefully examined and the sheep on farms from which cases have been found are subjected to examination by the palpation of the superficial lymph glands. The reduction in the percentage of infection in two large flocks, following this procedure between 1931 and 1934, is shown in a table : in one flock the percentage fell from 9·3 to 1·9 and in the other from 8 to 1·7.

Pulpy Kidney Disease caused only slight loss.

Short notes are also given on parasitic diseases, " circling disease", contagious ophthalmia, " stiffness " in lambs, congenital goitre in lambs, facial dermatitis, mycotic dermatitis and a deficiency disease of lambs.

Diseases of Pigs.

Swine Fever.—An outbreak occurred around Wellington, the first for some 30 years. Pigs were slaughtered and sties burned on affected farms, and the disease was stamped out. The source of entry was considered to be stolen garbage from overseas ships. Restocking of the farms has been carried out without a recurrence of the disease.

Pasteurellosis and Necrotic Enteritis outbreaks in pigs were more numerous, due to the dry season and methods of feeding.

Sarcoptic Mange in pigs has been satisfactorily dealt with by dipping in crude petroleum.

General.

Dairy Inspection received close attention in all towns to ensure a more hygienic milk supply.

Slaughter of Stock was carried out in registered premises as follows :– sheep, 2,867,245 ; lambs, 8,726,390 ; cattle, 475,549 ; calves, 945,853 and swine, 344,569.

The Poultry Runs Registration Bill became law and provided for administration of the industry by a Board of six members.—C. S. M. Hopkirk.

New Zealand. (1934). **Annual Report of Wallaceville Veterinary Laboratory.** [Hopkirk, C. S. M.]—*Rep. Dep. Agric. N.Z. 1933-34.* pp. 21-26. 5 tables.

The report of the laboratory deals with diagnosis and research work on animal diseases. The nutrition and biochemical reports are included. Routine examina-

tion of pathological specimens from all domestic animals is described and also the examination of milk and blood samples at the field laboratories at New Plymouth and Hamilton. Information is given concerning diagnosis of Johne's disease, anthrax, swine fever, etc. ; the outbreaks of anthrax and swine fever were exceptional for New Zealand.

Bovine Sterility.—T. A. Blake examined samples of seminal fluid from a large number of bulls and continued his work on diagnosis of partial sterility by estimating the percentage of abnormal sperms. Cunningham reported on investigations with rats on high protein diet in relation to the production of male sterility.

Mastitis.—The work of the three laboratories is tabulated. Studies have been made of the value of the assessment of the leucocytes of milk for the grouping of cows for milking purposes. This method is claimed to be superior to the other common tests in indicating infection. The owners of some 80 herds have been interested in the scheme. Such examination has shown that 55 per cent. of cows are normal, 35 per cent. have a slight infection and 10 to 15 per cent. have an acute infection. Curative trials with " entozon ", " azamine " and chlorine have yielded partially successful results, but success has not been as great as that recorded by certain European, chiefly continental, authors.

New work on mastitis to ascertain the importance of teat duct infection has been done : it has been found that infection of a teat duct causes a positive chemiotaxis to the teat duct from all parts of the gland to prevent further invasion, the number of leucocytes depending upon the type of organism entering.

Grass Tetany in Cows.—Affected animals have been cured by subcutaneous dosage with magnesium sulphate. Experimental work by Cunningham has shown that ingestion of " dolomite " and $MgSO_4$ can definitely raise the blood Mg of the animal.

Contagious Ophthalmia in Sheep.—Tears from affected sheep sprayed up the nostrils in a 1 per cent. dilution produced the disease in healthy sheep, but similar treatment of rabbits and calves yielded negative results. No rickettsia bodies were found. Filtered tears were not infective.

Nutritional Research and Disease in Pigs.—Experimental pigs were fed on skim milk and a further group on whole milk ; both were given meat meal but no grass was given as a supplement. *Bacterium suipestifer* was fed to both groups with the result that, whereas the whole milk group resisted all infection, the skim milk group showed serious sickness followed in some individuals by death.

Miscellaneous.—Dr. Marion McOwan, a Carnegie scholar working at Wallaceville, found that green grass had a high vitamin A content.

Detailed reports of the work by I. J. Cunningham, Dr. Marion McOwan and S. W. Josland are appended to the laboratory report.—C. S. M. Hopkirk.

New Zealand. (1934). **Report of the Chemistry Section.** [Aston, B. C.]—*Rep. Dep. Agric. N.Z. 1933-34.* pp. 54-58. 1 table.

Some matters of interest to veterinarians appear in this report.

A résumé of the use of limonite as a preventive of " bush sickness," both experimentally and on a wide scale in farming, is given. Its value has been conclusively proved and it is now possible to conduct live stock farming with success on pumice lands. Many manufacturers have, however, been selling inferior limonite, which was more or less useless, as a result of using poor rock, of heating it excessively before grinding and of contaminating it during grinding with calcium carbonate : all three factors result in a decrease in available iron in the limonite. The use of lime fertilizers in bush-sick country is contra-indicated for the same reason.

Analyses of bones have been carried out from a number of animals, particularly so-called " rickety " sheep : there was a low total ash and a low ash-organic matter ratio.

An iodine investigation in progress on sheep thyroids has provided a survey of iodine conditions throughout the majority of districts in New Zealand.

Analyses of various stomach contents, etc., were performed for poisons for the Live Stock Division.—C. S. M. Hopkirk.

Cyprus. (1934). **Annual Report of the Veterinary Service for the Year 1933.** [Roe, R. J.] pp. 16. 6 tables. Nicosia : Govt. Printer. [fcp].

The full staff consists of two British veterinary officers, a veterinary inspector, nine stock inspectors and four indoor helpers.

The drought which prevailed in 1932 continued in 1933 and the health of livestock suffered accordingly. The headquarters of the Veterinary Department were partially destroyed by fire in August, but new premises were ready for occupation at the end of the year.

The livestock census returns and export returns are given. Large animals are counted every second year and small animals annually. The latest figures are :– 4,600 horses, 10,000 mules, 54,000 donkeys, 1,300 camels, 43,600 cattle, 213,000 goats, 292,000 sheep and 22,000 pigs. There is a good export trade in all classes of livestock, mainly to Palestine, Egypt and Syria : in 1933 its aggregate value was £63,583.

The Horse-Breeding Law of 1930 and the Milk and Dairies Regulations of 1928 are administered by the Chief Veterinary Officer. The former regulates stud work by licensing stallions and the latter control the dairy milk supply. The standard of milk hygiene in the principal towns is very high. All cows in registered dairies have to be tested with tuberculin (double intradermal). Only one reactor was found in 1933.

In 1931 a meat inspection service was inaugurated and one stock inspector was sent for special training to Cairo and Vienna. Inspection is now carried out at the four principal towns – Nicosia, Limassol, Larnaca and Famagusta.

There are ten stud stables in the island and a government stock farm at Athalassa. There is also a veterinary hospital at Nicosia.

Diseases of Animals.

A table shows the incidence of the more important diseases according to seasonal periods. Anthrax was diagnosed in 14 districts, chiefly in sheep and goats. Vaccination is practised on a large scale, the vaccines, except that for horses, being prepared in the laboratory of the department for the first time. Tetanus is common, blackleg is rare ; *Br. abortus* infection has been eradicated from the Government farm ; contagious abortion in sheep and goats was notified in a few areas, *Bact. abortus ovis* being identified for the first time in 1932. *Br. melitensis* infection was found in three goats of a herd imported from Malta. One case only of bovine tuberculosis was diagnosed.

Goat pox appeared in eight areas in 1933 : it had not been observed between 1924 and 1930. Sheep pox had not been observed since 1922, but was reported in March and had spread widely by the end of the year. Mortality averaged about 6 per cent. A vaccine was prepared [see below]. Another pox-like disease known as " animevloyia " (chicken pox), the exact nature of which is unknown, also occurs in sheep. Contagious pustular dermatitis in goats and sheep was reported in 11 areas.

A disease of working cattle characterized by lameness and clinically resembling " styfsiekte " of South Africa caused considerable loss. It cannot be investigated

biochemically owing to the lack of laboratory facilities and its cause is not known.

The common parasitic diseases occur in sheep and goats. Horses suffer from internal and external habronemiasis.

Veterinary Laboratory. [Manley, F. H.]

The diagnostic returns are given. The preparation of anthrax vaccines for use on sheep and goats is described : these are made according to the technique used at Onderstepoort. Experiments with a saponin-culture vaccine caused excessive local reactions, but preliminary tests with a formalinized blood culture gave favourable results.

Two types of vaccine against sheep pox were made ; a boric acid-virus mixture and a formalin-virus mixture. The mode of preparation is given. Preliminary tests gave good results. A paper describing research into contagious pustular dermatitis was published separately [this *Bull.* **4.** 733]. Individual cases of a nodular disease of goats, a pyogenic infection of pigs and caseous lymphadenitis of sheep are also reported upon.—J. E.

United States of America. (1934). **Report of the New York State Veterinary College at Cornell University for the Year 1932-1933.** [Hagan, W. A.] pp. 213. 55 tables. Albany : J. B. Lyon Co. [8vo].

The Veterinary College at Cornell is taking steps to raise the educational standard for the admission of students and is making provision for alternative fields of specialization in the curriculum for students in their final year. The number of students in residence at the end of the year was 170. Short courses of post-graduate instruction are also given and are well attended.

Diagnostic and Advisory Services.—There are three diagnostic laboratories, two being concerned solely with poultry diseases (at Ithaca and Farmingdale, Long Island).

Rabies was diagnosed from the brains of four out of 23 dogs examined and in one cat. Swine erysipelas was diagnosed in New York State for the first time.

Research.—The work of each department is briefly described. Diseases investigated include bovine mastitis, equine infectious anaemia (swamp fever) and bovine contagious abortion (*Br. abortus* isolated from man was found virulent for cattle), *Br. abortus* infection in swine, trichomonad infection in cattle, vibrionic abortion in ewes, metabolic disorders of cattle, Johne's disease and fowl diseases.

A list of publications by the staff is given and many original or reprinted articles are given in full in the report. [These are being, or have been abstracted separately for this *Bull.*].—J. E.

France. (1934). Rapport sur les travaux du Laboratoire militaire de Recherches vétérinaires pendant l'année 1933. [**Report on the Military Veterinary Research Laboratory for 1933**]. [Carpentier].—*Rev. vét. milit.* **18.** 105-117].

The laboratory was in charge of Veterinary Commandant Carpentier, with the assistance of one other veterinary officer.

Infectious Diseases.—Four cases of glanders were diagnosed serologically. Five specimens were negative for anthrax. Research on strangles showed that antibodies rapidly disappear from the blood of recovered animals and that convalescent serum is therefore of no therapeutic value. *Streptococcus equi* antivirus is, however, prepared and a large amount was issued during the year.

Typhoid Diseases.—This term includes equine diseases of varied symptoms. Serum and other material received was tested serologically for *Bact. paratyphosum* B

(equine strain) and for *Str. equi*. Positive results to both or either of these organisms totalled 77 per cent. In one regiment an outbreak of " equine typhoid " coexisted with paratyphoid in the soldiers : community of infection was not investigated far enough to enable any conclusions to be reached.

A severe outbreak of equine infectious anaemia occurred in a regiment at Belfort and 30 horses died : diagnosis was based on gross and microscopic morbid pathological findings, blood sedimentation and other tests, and animal inoculations.

Piroplasmosis was diagnosed in two horses. Information is also given on pyogenic infections, including ulcerative lymphangitis and brucella infection in fistulous withers, on worm and fungoid parasites and on tumours, etc., sent for diagnosis.—T. Dunlop Young.

Levant. (1934). Rapport sur le Fonctionnement du Laboratoire de Recherches du Service Vétérinaire des Troupes du Levant pendant l'année 1933. [**Report of the Army Veterinary Research Laboratory, Levant, for 1933**]. [Soulié].—*Rev. vét. milit.* **18.** 127-142.

This laboratory, at Beirut, under the direction of Veterinary Captain Soulié, serves as a diagnostic centre for animal disease in French mandated territory in Syria. The section on diagnosis gives an indication of the diseases occurring in the territory.

One case of tuberculosis was diagnosed in a Barb horse by Verne's resorcin and by a tuberculin test.

Glanders is still encountered, but is being gradually stamped out.

Anthrax is not common and is controlled by the wide use of vaccination.

A case of staphylococcal furunculosis in a horse was observed : treatment with an autogenous vaccine yielded successful results.

Cutaneous ulceration in camels, limited mainly to the regions of the udder, shoulder, breast or back, was reported. Various bacteria have been isolated from cases. [This may be identical with the contagious necrosis of the skin, " jhooling ", of India].

Epizootic lymphangitis is present in the territory.

Piroplasma [*Babesia*] *caballi*, *Nuttallia* [*Babesia*] *equi* and the common piroplasms of cattle and dogs were encountered. " Gonacrine " and " trypaflavine " are both efficacious in treatment.

Dourine [*Tryp. equiperdum* infection] is present in the Levant, but was only diagnosed in one stallion during the year. Fulton's reaction and the formol gelification test were employed and trypanosomes disappeared from the blood after dosage with " trypaflavine".

Rabies was diagnosed in 23 dogs, two cats, one wolf and one horse.

Outbreaks of sheep and goat pox occurred in the winter of 1932 to 1933 and were controlled by clavelization and variolization.

Fowl cholera, fowl typhoid, fowl plague and fowl pox were observed.

Notes are also given on meat inspection and chemical analyses.

The common internal and external parasites of domestic animals were observed.

—T. Dunlop Young.

Miessner, H., & Köser, A. (1934). 9 und 10 Sammelbericht der Reichszentrale für die Bekämpfung der Aufzuchtkrankheiten. [**Ninth and Tenth Collective Report of the Reich Centre for the Campaign against Diseases of Breeding Animals and of New-Born Livestock**].—*Dtsch. tierärztl. Wschr.* **42.** 418-432. 3 tables.

This report covers the two years between April 1931 and March 1933 [see also this *Bull.* **2.** 530].

Diseases of Horses.

Sterility.—1,468 mares were examined and the chief cause was found to be catarrhal endometritis. East Prussia is the principal horse-breeding province in Germany and provided the greatest amount of material for examination. There are three pregnancy diagnosis stations – at Bonn, Hanover and Munich. Several workers give their results of the treatment of sterility by many varied methods.

Abortion.—302 foetuses were examined : *Streptococcus pyogenes* was found in 13·2 per cent. ; *Bact. abortus equi* in 12·6 per cent. ; *Bact. equirulis* in 5 per cent. ; *Bact. coli* in 3 per cent., and the remaining 66 per cent. were bacteriologically negative. Of 374 samples of uterine secretion examined, *Str. pyogenes* was found in 19 per cent., various cocci in 7·8 per cent., *Bact. coli* in 3·2 per cent., *Bact. abortus equi* in 2·1 per cent., and 68 per cent. were bacteriologically negative.

Bact. abortus equi was a rare cause of abortion in most parts of Germany and was most prevalent in East Prussia (13 per cent. of cases). Only 22·5 per cent. of 1,679 blood agglutination tests were positive for this organism.

1,525 similar blood tests of healthy unvaccinated mares were carried out and 15 per cent. reacted at a dilution of 1 : 500. Experience has indicated that *Bact. coli* has very little significance in equine abortion in Germany. Hygienic measures and, to a less extent, specific vaccination are of the greatest importance in combating equine abortion. Streptococcal abortion is very difficult to eradicate.

Diseases of Foals.—483 dead foals were examined ; streptococci were present in 20·7 per cent. *Bact. equirulis* in 19·7 per cent., *Bact. coli* in 19 per cent., *Corynebact. pyogenes equi* in 2·3 per cent. and *Bact. abortus equi* in 1 per cent. ; 34 per cent. of cases were bacteriologically negative. Numerous notes on cases and outbreaks observed are contributed by various workers.

Diseases of Cattle.

Sterility.—This becomes progressively more important. All the provincial stations are dealing with numerous cases, that of Breslau heading the list with 63,000 animals examined during the period. Much statistical information is given. With regard to the cause of sterility, ovarian disorders constituted the greatest single cause according to three reports, and endometritis according to four other reports.

The percentages of cases successfully treated are very high and vary between 64·5 and 81 per cent.

Abortion.—This section also contains a wealth of statistical data. 30 per cent. of 103,000 samples of material were found positive for *Br. abortus*.

In Württemberg, in which province a voluntary eradication scheme for bovine contagious abortion was begun in 1933, 60 per cent. of participating farms were found to be infected.

For the testing of sera, Gminder found the Menk reaction to be more reliable than the agglutination or complement-fixation tests in cases where the agglutination titre was below 1 : 100. Vaccination was not used so much as a means of control and more attention was paid to hygiene (special calving boxes, etc.). The true importance of trichomonads as a cause of abortion is thought to be very small (0·1 per cent. according to the statistics given), though Drescher gave a figure of 10 per cent. for one district.

Diseases of Calves.—The results of diagnostic work on 5,254 specimens are given under 16 headings. *Bact. coli* (42·2 per cent.) heads the list, followed by *Bact. enteritidis* Gärtner and streptococci (10 per cent. each). Specific biological therapy against white scours was recommended by some reporters for use both on calves and on their dams.

Diseases of Sheep.

Abortion.—193 foetuses were examined : *Bact. abortus ovis* was found in 20·7 per cent. ; *Vibrio foetus* in 11·3 per cent. ; *Br. abortus* and *Bact. coli* in 3·6 per cent. each.

Diseases of Lambs.—924 examinations were made and some 20 diseases were diagnosed, *Bact. bipolaris* [*Pasteurella* sp.] being most frequently found (18 per cent.). Rautmann gives a report of lamb diseases and arranges them in three groups according to age (2 to 14 days, 3 to 16 weeks and 16 weeks onwards).

Diseases of Goats.

Only a few cases were investigated.

Diseases of Swine.

Sterility is unimportant, though a few cases are referred to.

Abortion.—306 foetuses were examined : 65 per cent. were bacteriologically negative ; 16·6 per cent. showed infection by *Bact. coli* and 5·9 per cent. brucella infection. Both *Br. abortus*, bovine strain, and *Br. abortus*, porcine strain, are reported.

Diseases of Piglets.—6,953 examinations were made and some 18 diseases were diagnosed, *Bact. coli* infection heading the list (15·8 per cent.), followed by " enzootic pneumonia " (10·2 per cent.), *Bact. bipolaris* [*Pasteurella* sp.] infection (9 per cent.) and streptococcal infection (8·5 per cent.). Several notes on individual cases are given.

Diseases of Fur Animals.

The results of investigations of 312 dead foxes, rabbits, etc., are given.

Diseases of Poultry.

Domestic Fowls.— 15,888 carcasses were examined : *Bact. pullorum* infection was found in 13·7 per cent. and coccidiosis in 18 per cent. Laryngotracheitis, not previously observed in Germany, was encountered in fowls in contact with others imported from America. Fowl paralysis showed an increased incidence.

Geese and Ducks.—The gizzard worm, coccidia and enteritis caused most losses in geese and paratyphoid infection was most important in ducks.

Notes are also given on turkeys, pheasants, guinea fowl and pigeons.—J. E.

Germany. (1934). 7. Tagung der Fachtierärzte für die Bekämpfung der Aufzuchtkrankheiten in Bonn vom 25. bis 28. Mai 1934. **[Seventh Session of the Veterinary Specialists for the Campaign against the Diseases of Breeding Animals and of New-Born Livestock at Bonn, May 25th to 28th, 1934].**—*Dtsch. tierärztl. Wschr.* **42.** Nos. 27, 28, 29 and 30.

Just over 100 veterinarians, including a few foreigners, attended this bi-annual meeting postponed from the autumn of 1933. Professor Miessner assisted by Dr. Köser [above] gave a collective report of the results of two years' work on the laboratory diagnosis carried out and advice given in respect to material sent in from all parts of Germany. In addition, several members presented papers for discussion [the titles of these have appeared in *Index Veterinarius* and abstracts of most of them have appeared or will appear in this *Bulletin*].—J. E.

Italy. (1934). Servizio veterinario - profilassi e polizia veterinaria, ispezione delle carni e degli alimenti d'origine animale. **[Report of the Veterinary Service for 1933].** [Bisanti, C.]—*Relaz. Direz. gen. Sanit. publ. Roma, 1933.* pp. 288-304. 2 tables.

During recent years the Italian state veterinary services have been considerably extended, not only as the result of the recent legislation by the Ministry of Health

regarding meat, milk and dairy inspections, but also as the result of the general attack on infectious diseases of animals. In this connection, veterinary institutes have been established in various provinces. These now number nine, and in some areas one or two subsidiary stations have also been established. In each case their foundation has been due to local influence, but they depend for their maintenance upon grants made by the Ministry of Health, the Minister being also responsible for the general conduct of their work. Their main functions are to examine specimens and to manufacture the sera, vaccines, tuberculin, etc. required in their province. These products must conform to the regulations recently passed for the standardization of immunizing products for veterinary use, the regulations being very similar to those in force for human sera and vaccines. The institutes also carry out research work and make field observations upon infectious or other diseases of importance which are affecting the livestock in their province.

Foot and Mouth Disease.—Since 1932 outbreaks have been decreasing. Attacks have been mild and the usual veterinary precautions have been sufficient to keep the disease under control.

Anthrax.—Systematic and vigorous action has been taken to immunize all susceptible animals.

Blackleg.—Sporadic outbreaks have been encountered and 35,000 animals have been immunized.

Sheep Pox.—This disease appears to be decreasing as the result of strict veterinary measures.

Infectious Diseases of Pigs.—Prophylactic measures have been vigorously continued against such diseases as erysipelas, paratyphoid, etc.

Infectious Diseases of Hens.—Seventy-one outbreaks of fowl cholera were notified in February, these had fallen to four in August.

Rabies.—A system of capturing all stray dogs has been adopted by the communes. 61,347 stray dogs were caught and 44,448 were destroyed as they were unclaimed by their owners.

Glanders.—Sixty-four horses suffering from glanders were killed during the year.

Bovine Sterility.—In some provinces, the use of special therapeutic measures has resulted in the recovery of up to 60 per cent. of the affected animals.

Epizootic Abortion.—Vaccination with both dead and living vaccines has been widely practised.

Tuberculosis.—An antituberculosis vaccine has been prepared at Milan, and 10,063 test animals have been vaccinated or revaccinated in an attempt to establish its value in the field.—J. A. Nicholson.

Italy. (1934). Stazione sperimentale della Sardegna. Relazione durante l'anno 1933. [**Report of the Veterinary Research Institute, Sassari, Sardinia, for 1933**]. [Pegreffi, G.] pp. 15. Typescript. [fcp].

1,669 specimens were examined, several inspections made and numerous enquiries answered. The compulsory vaccination of susceptible animals against anthrax produced beneficial results. An acute infectious toxaemia resembling blackleg was met with in cows; in some cases bacteriological examination failed to reveal the causal organism, whilst in other cases *Clostridium welchii* has been isolated. Streptococcal mastitis in cows appeared for the first time in the island. The losses from mastitis in ewes and goats were materially reduced by the use of an autogenous vaccine.

Outbreaks of piroplasmosis and anaplasmosis occurred amongst sheep. The study of bovine piroplasmosis and theileriasis is being continued and "acryon",

a new preparation, has given satisfactory results as a curative agent. Parasitic diseases received much attention and the Institute has planned a systematic attack on such diseases to be undertaken in the near future.—J. A. NICHOLSON.

ITALY. (1934). Istituto Zooprofilattico Sperimentale delle Tre Venezie, Padova. Relazione sull'attivita svolta dall'istituto durante l'anno 1933. [**Report of the Veterinary Research Institute, Padua, for 1933**]. [BARDELLI, P. C.] pp. 34. 3 tables. Faenza : Stabilimento grafico fratelli Lega. [8vo].

The Institute has completed the first five years of its life and a report of its activities has been drawn up in order to indicate the lines on which it has extended and to show that the value of the work accomplished has fully justified those who urged its foundation. The list of specimens examined during 1933 includes representatives of nearly all the domestic animals and birds, whilst there was a heavy call on the numerous biological products manufactured at the Institute. Contagious abortion was found to be the most prevalent infectious disease of cattle in the province, whilst cholera and diphtheria were wide-spread amongst fowls.

The research work undertaken by the Institute included an examination of the condition known as fluorine cachexia in cattle and goats. In affected districts a correlation was established between the fluorine discharged into the atmosphere by factories, injury to the pastures and the increase of the fluorine content of the bones of affected animals.

From 22 persons suffering from undulant fever, *Br. abortus* was isolated in three cases. On one occasion *Br. abortus* (bovine strain) was isolated from a woman who had aborted at the fifth month of pregnancy ; the organism was also recovered from the foetus.—J. A. NICHOLSON.

ITALY. (1934). Stazione sperimentale zooprofilattica del Mezzogiorno " Nicola Miraglia ". Relazione nel 1933. [**Report of the Veterinary Research Institute, Naples, for 1933**]. [CRIMI, P.] pp. 44. 1 table. Portici : Stab. Tip. Bodoniano. [8vo].

The establishment of three subsidiary stations in the area has been of great assistance and has made the work of the main Institute of much greater value to the whole province. The production of immunological products has been one of the most important activities of the Institute, whilst the examination of specimens sent in for diagnosis and the enquiries answered have also entailed much work. A special course for veterinary students in the examination of pathological material, microscopic technique, etc., has been conducted at the Institute during the year ; students have also been able to study at the branch stations.

—J. A. NICHOLSON.

ITALY. (1934). Stazione sperimentale " Salvatore Baldassarre " Foggia. Relazione durante l'anno 1933. [**Report of the Veterinary Research Institute, Foggia, for 1933**]. [DE PAOLIS, E.] pp. 10. 1 table. [8vo].

The material sent in for diagnosis and the enquiries which have been answered have increased considerably during the year. In certain communes, undulant fever has been prevalent amongst the inhabitants, and the Institute undertook an examination of the goats in the area in an attempt to trace the source of the infection. Less than 1 per cent. of the 2,000 goats examined gave a positive agglutinating serum. Immunization experiments against abortion in mares have furnished satisfactory results and it has been established that 25 per cent. of non-vaccinated

animals abort. Polyvalent and specific vaccines and sera have been supplied in increasing amounts, particularly sheep pox vaccine and vaccines for the prevention of infectious diseases of pigs. The results of experiments on laboratory animals to determine the value of a new anthrax vaccine were so encouraging that the work has been extended to the field. In the area selected for the trial no case of anthrax in a vaccinated animal was observed for at least a year.—J. A. NICHOLSON.

ITALY. (1934). Stazione sperimentale per le malattie infettive del bestiame, Brescia. Note illustrative e relazione tecnica anno 1933. xi. **[Report of the Veterinary Research Institute, Brescia, for 1933].** [UBERTINI, B.] pp. 20. 2 tables, 2 charts, 3 photographs. Brescia : Unione Tipo-Litografica Bresciana. [4to].

The Institute consists of a central building containing laboratories and administrative offices, together with stables for the serum-producing animals and a few other small buildings. The finances of the Institute have received assistance from various sources, one of these being livestock owners in the province.

The demands made upon the Institute have been heavy. The Institute has undertaken the bacteriological examination of the carcasses of animals killed because they were suffering from some chronic disease, and by this means such meat which would otherwise have been destroyed has been saved for human consumption. A study of sporadic abortions amongst cows has shown that bulls are largely responsible for spreading a trichomonas infection. In a number of cases this organism has been isolated from the uterine discharge either in pure culture or associated with *Corynebact. pyogenes*. A chronic metritis usually follows such an infection. Swine fever has been prevalent in the province. Experiments have been undertaken to establish the value of BCG vaccine as a preventative of tuberculosis in calves kept under the conditions prevailing in the province.

—J. A. NICHOLSON.

ITALY. (1934). Stazione sperimentale per le malattie infettive del bestiame, Milano. Relazione tecnica 1933. **[Report of the Veterinary Research Institute, Milan, for 1933].** pp. 15. 2 tables. Typescript.

The Institute has examined 3,676 specimens and undertaken 132 visits either to confirm diagnosis or for the treatment of bovine sterility ; the biological products required in the province have also been prepared. In one outbreak of foot and mouth disease it was shown that type A virus was the agent responsible. Contagious abortion was wide-spread in the province and both dead and live vaccines were issued. Large doses of dead vaccine are given to cows more than three months pregnant and also to clean animals which are likely to come into contact with infected animals. The use of the live vaccine has assisted in reducing the incidence of abortion from 15 to 3 per cent. in affected herds. Streptococcal mastitis has become common and an autogenous vaccine has been prepared which in some cases gave satisfactory results. The Institute has also carried out an investigation into the aetiology, prevention and treatment of metritis in cattle. Infectious anaemia of horses has been prevalent and experiments with a vaccine prepared from the emulsified spleen of animals suffering from the acute form of the disease have been carried out. In pigs, an acute fibrinous enteritis has been encountered ; the causal organism was shown to be a coliform bacillus. The losses amongst hens have been mainly due to cholera, *Bact. pullorum* infection, fowl paralysis and parasites.—J. A. NICHOLSON.

BOOK REVIEWS.

EBER, A. [Dr. Med., & Med. Vet., Prof. & Direct. Anim. Dis. Inst., Leipzig Univ.], & PALLASKE-EBER, Ruth. [Former Assistant, Anim. Dis. Inst.] (1934). Die durch Obduktion feststellbaren Geflügelkrankheiten. [**The Diseases of Poultry Diagnosable at Autopsy**]. pp. ix + 320. 43 figs., 2 tables. Hanover: M. & H. Schaper. [4to] [RM.21].

The senior author has been working on poultry diseases since 1910 and this book represents the sum of his experiences in this field. With poultry diseases, in contradistinction to the diseases of quadruped farm animals, the expert has to deal to a much greater extent with dead specimens in diagnosing the disease. The authors have given special attention to diagnosis by *post-mortem* macroscopic examination alone, with the object of helping, with a minimum of expense, the general practitioner for whom the aid of a laboratory is lacking, and they have developed it as much as possible without reference to bacteriological aids. [This is of course an unjustifiable procedure: certain of the most important contagious poultry diseases can only be diagnosed accurately by means of bacteriological methods; failure to make use of such methods might lead to erroneous diagnosis, with serious consequences.—Ed.].

A very large number of disease conditions are dealt with by the authors. After opening with chapters on general technique, the main sections deal with poisoning (chemicals, plants, etc.), mycotic diseases, bacterial infections, virus diseases, protozoan invasions, worm infestations, metabolic disorders, tumours, sporadic diseases of the body system and individual organs and traumatic conditions.

The figures are not so numerous as might have been expected in a book of this nature and some are not up to the highest standard of clarity usual in German books. The use of contrasting type is of assistance to the reader. Both contents list and index are good.—J. E.

CAMERON, T. W. M. [T.D., M.A., Ph.D., D.Sc., M.R.C.V.S., Res. Prof. Parasitol., McGill Univ., Director Inst. Parasitol., MacDonald Coll., Canada]. (1934). **The Internal Parasites of Domestic Animals. A Manual for Veterinary Surgeons.** pp. xii + 292. 144 figs., 17 plates, 6 tables. [8 pp. refs.] London: A. & C. Black, Ltd. [8vo] [15s.]

In the earlier days of their development the two new-fledged subjects helminthology and protozoology were taught together under the heading of "parasitology" in many institutions, and it is, doubtless, as a relic of those days that this book on veterinary helminthology includes a 30-page summary of veterinary protozoology. As much information as possible is crammed into that space but, although it may be very useful indeed for last minute revision before an examination, it can hardly satisfy those who are looking for full information on any protozoan disease. Some idea of the scope of the book may be derived from the following statement of the various sub-divisions and the number of pages allotted to each: part 1, "Introduction to Parasitology", 9 pages; part 2, "The Protozoa", 30 pages; part 3, "The Helminths", 169 pages; part 4, "Immunity and Serology", 20 pages; part 5, "Therapeutics of Helminthic Infections", 8 pages; part 6, "Technique", 23 pages and part 7, "Host Lists and Bibliography", 16 pages.

Particularly pleasing features are the notes on the history of parasitology which appear in the introduction, and the assigning of special sections to serology and immunity and to outlines of the technique, intended to aid those who have no ready access to laboratories. The main part of the book deals with the com-

moner and more important helminths of the cat, dog, fowl, horse, pig, ox and sheep ; each of the three sections Nematoda, Trematoda and Cestoda commencing with an account of the classification of the species which they contain and being followed by descriptions of genera and species, illustrated by diagrams which for the most part are helpful and good. There are no less than 18 diagrammatic representations of the life histories of parasitic worms, which will be a pleasing feature to students but, although the compromise between an illustration of the parasite and a representation of the life history is very good, some readers may prefer straightforward illustrations as being of greater assistance in the identification of parasites. Notes on the pathogenesis of the parasites and the pathology, diagnosis and prevention of the diseases which they may cause are brief, and the account of specific treatments is almost entirely confined to a short table in the section on therapeutics.

The text reads well and the several diverting notes of miscellaneous information witness to the author's wide interest in parasitology. There are, however, numerous signs of want of care in compilation and proof-reading, between the first page of the introduction, where the title of Baylis' book is wrongly given, and the last two pages of the text, 275 and 276, where " *Gongylomena* " appears in the ox and the location of *Cooperia* in the sheep is said to be the fourth stomach, where in actual fact it is rarely found. The following are some of the small errors and omissions which have been noticed :– figures 13, 14, 21, 89, 118, 119 and 127 either are not explained or indicate various parts by letters which are not mentioned in the text ; figure 34 clearly represents *Strongylus vulgaris* and not *S. edentatus* as stated, the diagrams J and L should be interchanged in figure 119, and on page 105 " several species " of *Trichostrongylus* are said to occur in the horse's stomach, although *T. axei* appears to be the only one which has been recorded.

From a veterinary student's point of view, however, the book represents a great advance on the only text-books which have been available until recently, and a useful amount of up-to-date information can be obtained at a very moderate price.—E. L. Taylor.

Richters, C. E. [Prof. Dr. Med. Vet. Head of the Army Veterinary Diagnosis Office.] (1934). Die Tiere im chemischen Kriege. [**Animals in Chemical Warfare**]. pp. 188. 78 figs., 8 plates, 3 tables. [129 refs.] Berlin : R. Schoetz. [2nd Edit.] [8vo] [RM.10.80].

This is a re-edition of the work reviewed in this *Bull.* **4.** 456, and does not contain important material changes or additions. It includes, however, further pathological and therapeutic data, and describes better measures for the protection of animals against explosive and incendiary bombs.

It is interesting and significant to read in this up-to-date book that no valuable addition has been made to the list of possible effective " gases." For example, the substitution of bromine for chlorine in mustard gas decreases its volatility, but this advantage is nullified by the decrease in stability towards water. Informed scientists will agree with the coldness of the author's attitude towards journalistic reports of " new war materials of almost unheard-of activity." Similarly Richters in a short new section of his book argues on hygienic and bacteriological grounds against the possibility of causing true epidemics by aerial methods.

It is fair to point out that the author's writings in the current periodical agricultural and veterinary literature as well as in this book are overwhelmingly directed to defensive as opposed to offensive methods.

The value of the work is increased by a useful author and subject index.

—G. D. Lander.

FAIRBROTHER, R. W. [M.D., M.R.C.P., Lecturer Bact. and Assistant Director Publ. Health Lab., Manchester Univ.] (1934). **Handbook of Filterable Viruses.** pp. ix+193. 2 figs., 3 plates. 5 tables. [383 refs.] London : William Heinemann (Medical Books) Ltd. [8vo] [7s. 6d.]

This small book gives a general survey of the viruses, with special reference to those causing disease in man. Approximately half the book is given to a general discussion on the nature of viruses, their cultivation and microscopic study epidemiology and immunity, and classification. The other half is devoted to diseases of man caused, or believed to be caused, by filtrable viruses.

The literature on virus diseases and on the behaviour of viruses has become very large. Special technical methods have been developed and a wide range of experimental animals have been used. The list of diseases due to filtrable viruses is constantly being added to and has now reached a formidable length. Under the circumstances, a general survey of the subject will be found to be valuable to the student and general reader.

The author has succeeded in making his general survey very readable and brief. The value of the book is considerably enhanced by the numerous references, given at the end of each chapter.

To the veterinary student, practitioner and research worker, the book will prove valuable, as a general knowledge of the virus diseases of man is essential to a proper appreciation and understanding of virus diseases in the lower animals.

—L. B. BULL.

HAUDUROY, P. [Préparateur Fac. Med., Paris]. (1934). Les ultravirus pathogènes et saprophytes. **[The Pathogenic and Saprophytic Filtrable Viruses].** pp. 462. 17 figs., 22 tables. [Numerous refs.] Paris : Masson et Cie. [8vo] [Fr.60].

Hauduroy has already published a useful treatise on the filtrable viruses with special reference to their relationship to filtrable forms of bacteria. He has now completely rewritten the book in a more extended form so as to embrace recent discoveries in the branch of diseases due to viruses. The book can be recommended as a useful summary of present-day knowledge on this subject.

The first part, comprising six chapters, deals with the technique of filtration, methods of cultivating viruses, etc. ; the second part gives a general outline of the virus diseases of plants, insects, birds, small animals, pigs, cattle, horses and man ; finally several chapters are devoted to problems of physiology, immunity, epidemiology, etc.

The author has taken considerable pains to furnish a representative bibliography for each section and the text is liberally provided with references to the more important investigations into the subject under discussion ; in addition, an attempt has been made to proffer a critical survey of published data, reasons being given for agreement or disagreement with the findings of other workers. This form of presentation is stimulating and undoubtedly adds to the value of the book. It may be suggested, however, that this method has resulted in a certain unevenness in the selection of material. For example, in chapter I, part III, very elaborate details are given for the preparation of collodion solutions and the manufacture of membranes suitable for filtration of viruses, but there is scarcely any reference to the important investigations of workers such as GATES and OLITSKY, ELFORD and many others. The latter omission is particularly curious, since in later chapters the author frequently cites the work of ELFORD and his colleagues on the estimation of the size of virus particles by filtration through graded collodion membranes and insists that accurate results cannot be expected unless the conditions of preparation

of these membranes are exactly governed.

Amongst the chapters on the virus diseases of animals, the section on foot and mouth disease may be singled out on account of the excellent manner in which a wealth of material has been summarized without loss of essential details. It will be noted that the author does not include pleuro-pneumonia or contagious agalactia in the group of virus diseases.

The book should provide a useful reference volume for laboratory workers.
—R. E. GLOVER.

—. (1933). **Medicine in its Chemical Aspects.** pp. 217. 11 figs., 4 plates, 7 tables, 4 charts. [20 refs.] Leverkusen, Germany : Bayer-Meister Lucius. [8vo].

This booklet is a series of short review papers, originally published in German under the title " Medizin und Chemie " and dealing with problems investigated in the medico-chemical laboratories of I. G. Farbenindustrie A. G. Authorship and titles are as follows :– H. HÖRLEIN, " Medicine and Chemistry " ; C. L. LAUTENSCHLÄGER, " Research on Natural Produce for the Production of Valuable Medicaments " ; L. BENDA, " Chemotherapeutic Acridine Preparations " ; W. SCHULEMANN, " Chemical Constitution and Action of Medicines " ; F. LAQUER, " Methods and Aims of Vitamin Research " ; R. BIELING, " The Evolution of the Theory of Immunity " ; R. SCHNITZER, " The Development of Chemotherapy in Bacterial Infections " ; W. KIKUTH, " Immunity in Protozoal Diseases " ; H. SCHMIDT, " A Contribution towards the Comparison of Chemotherapeutic Elements " ; G. DOMAGK, " Recent Advances in Histological Technique " ; H. SCHMIDT, " The Present Methods of Combating Diphtheria " ; O. SCHAUMANN, " Suprarenin and Allied Compounds in Local Anaesthesia " ; M. BOCKMÜHL, " Antipyretics and Analgesics of the Pyrazolon Series " ; H. WEESE, " From the Evolution of the Synthesis of Hypnotics " ; R. RIGLER, " The Chemophysiological Basis of Work-Hyperaemia " ; F. SCHÖNHÖFER, " Studies in Alkaloids of the Cinchona Series " ; R. FUSSGÄNGER, " Standardization of the Male Sexual Hormone " ; O. WAGNER, " The Biological Principles of Experimental Therapy in Worm Diseases".

Each paper is concisely and clearly written and will be appreciated by medical men and veterinarians interested in the procedure of discovery of useful chemotherapeutic agents. Presentation is as popular as the nature of the subjects allows.
—H. H. GREEN.

FAVILL, J. [A.B., M.D., F.R.C.P., Ass. Clin. Prof. Neurol., Rush Medical College, Univ. Chicago]. (1933). **Outline of the Cranial Nerves.** pp. viii+112. 14 figs. [54 refs.] Chicago : The University of Chicago Press. [8vo]. [7s.]

In this little handbook, the author has attempted to provide information of value to the practising neurologist. Each cranial nerve is considered under five headings. The anatomical distribution of the nerve is described first, the method being to trace motor nerves from their supranuclear supply outwards, and sensory nerves from the periphery inwards. Next the function of the nerve is discussed, and then clinical tests applicable to the nerve under examination are described. Finally, a list of disease processes and their seat of action is given for each nerve. For the proper testing of motor nerves, a knowledge of the origin, insertion and action of certain muscles is essential, and this information has also been included where necessary. The text is amply illustrated by diagrams, and a study of the book should be of great assistance to all those who wish to have a clear picture of the functioning and diseases of the human cranial nerves.—J. A. NICHOLSON.

ADRIAN, E. D. [M.D., D.Sc., F.R.S., F.R.C.P., Foulerton Res. Prof., Royal Society]. (1932). **The Mechanism of Nervous Action, Electrical Studies of the Neurone.** pp. x+103. 35 figs. [62 refs.] London: Humphrey Milford, and Philadelphia: University of Pennsylvania Press. [8vo] [10s. 6d.]

The application of the methods of the pure physicist to physiology has only comparatively recently thrown much light on the electrical changes taking place in muscles and nerves, for, although many years ago it had been suggested that muscles could produce electricity, the currents set up were so small that, until the introduction of the thermionic valve as a means of amplifying them, their detailed study was impossible.

In this book the author deals with the electrical phenomena connected with the units which make up the nervous system and, since the nerve trunks have a comparatively simple structure, their study furnishes the main portion of the book. The author demonstrates the rapid potential changes which take place when a motor nerve is stimulated, and shows how these are exactly similar to the less intense electrical changes which occur in a motor nerve on the movement of, say, a toe. He also shows that electrical impulses passing along nerves are not all alike. Those in the sympathetic system and in the small sensory fibres are conducted much more slowly than those in the large motor and sensory fibres, and the question arises whether slow impulses produce pain reactions. On examining this question the author concludes that it is unsafe to assume that such is the case, but it is fairly certain that the effect of the message may depend upon the type of fibre in which it travels. The book also deals with the more complicated mechanism of the higher centres and the activity of nerve cells. The subject has been treated in a clear and interesting manner and the book is one which may be recommended to all physiologists.—J. A. NICHOLSON.

HUXLEY, J. S. [M.A., Hon. Lecturer Exp. Zool., King's College, London], & DE BEER, G. R. [M.A., D.Sc., Jenkinson Lecturer in Embryology, Oxford]. (1934). **The Elements of Experimental Embryology.** pp. xii+514. 221 figs. [37 pp. refs.] Cambridge: University Press. [8vo] [25s.]

During the last decade and especially since SEPMANN'S discovery of " organizers ", a vast mass of new facts and theories have made their appearance in the field of experimental embryology, so that a text-book on this subject can only deal with a fraction of the available material. Moreover, the developmental processes of animals cover such a wide field that the authors have limited themselves to a consideration of the early life of the embryo, that is, from the stage of undifferentiated cells up to the stage where the main organs are laid down and their tissues histologically differentiated. The book begins with a description of the early development of amphibia and the origin of polarity, symmetry and asymmetry, and the account which follows of the cleavage and differentiation of cells and the part played by organizers as the inducers of differentiation forms some of the most interesting chapters in the book. Passing on to the later stages of development, the formation of the amphibian nervous system is fully and clearly described. Finally, the book concludes when the true growth period of the embryo is reached, where the organs assume functional powers and the embryo can either feed itself or draw upon a store of accumulated food material. The book will prove of great value to all those interested in biology, not only because it is one of the first of its kind to be published in English, but also because the subject is so clearly expounded.—J. A. NICHOLSON.